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NATIONAL STANDARDS FOR FARM PRODUCTS

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INTRODUCTION

The development of national standards for farm products has been a process of evolution. Established trade practices yield slowly to change and improvement, and such changes as do occur are largely the result of economic necessity. At a relatively early date agriculturists who followed the trend of commerce and industry studied the possible benefits of national standards in the handling of cotton and grain, but the work was largely experimental. Real progress was made during the postwar period of agricultural depression when every function of our marketing machine was tested with a view to the possible elimination of waste. The whole standardization movement has been further expedited by the development of a specialized agriculture which has rapidly changed the marketing of farm products from a problem of local or regional importance to one of national and even international significance.

There has been so much discussion among the various groups of the industry as to whether it pays to grade agricultural products that it seems wise at the outset to point out that standardization is a

[1] Mr. Tenny resigned in 1928. This circular was revised in April, 1930, by Caroline B. Sherman, Division of Economic Information, in collaboration with the standardization specialists of the bureau.

means rather than an end in itself. Whether or not the producer or marketer is compensated for the additional effort and expense involved in making such classifications depends upon his subsequent marketing practices and the demand for standardized products in the channels of trade in which they are sold. For example, a country merchant seldom establishes price differentials for different grades when buying eggs from producers in very small lots. In contrast, large assemblers of eggs find it highly desirable to grade their shipments so that throughout the regular trade channels they may be bought and sold according to accepted commercial grades. As a general statement it may be said that the smaller the volume of business the less likely it is that grading to generally recognized standards will pay. In large-scale operations, however, standardization is now universally recognized as a basic requirement for success.

BEGINNING OF THE WORK

Prior to the organization of the Bureau of Markets in the United State Department of Agriculture in 1913, practically nothing had been accomplished in the field of national standardization of farm products. In 1914 the passage of the cotton futures act definitely established the department in this work. In 1916 the grain standards act was passed. The United States warehouse act of 1916 also provided certain authority for the promulgation of grades. The use of the official cotton and grain standards of the United States is required in all interstate transactions based on grade, and any standardized grades which may be formulated and issued under the warehouse act are also mandatory for the purpose of the act.

Use of grades in most of the standards recommended by the department is optional except that certain Government purchases must be based on these standards; that Federal farm products inspection service is based upon these standards and a number of States have passed laws requiring the use of some of these United States grades for the grading of their own commodities. The researches on which these grades are based and the recommendations of the department have been authorized by the various agricultural appropriation acts.

RELATION BETWEEN GRADE AND PRICE

Usually there is a direct correlation between grade and price, but not always. Exceptions occur for several reasons.

There are frequently certain factors which strongly influence market quality for which no practical method of measurement has been devised for use in commercial operations. For example, until comparatively recently the important factor of protein determination in wheat was ignored in commercial operations. It is true that it was given indirect recognition by paying a premium for wheat from sections where the average protein content was high.

Established trade practices have frequently associated grades with a limited number of factors. Cotton is graded chiefly on the basis of color and freedom from trash, while length of staple, equally important in trading, is dealt with separately.

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The complexities of grading have sometimes made it necessary to confine the grades to a single factor. The present official wool standards of the United States are based wholly on diameter of fiber.

Demand, and therefore price, in different markets varies according to buyer's wish, which does not always correspond to intrinsic value. Alfalfa hay, for example, is graded on the basis of leafiness, color, and foreign material, and the No. 1 grade is a combination of good quality on all three factors. Some hay buyers are partial to green color and others to leafiness irrespective of the other quality factors and will pay as much for No. 2 alfalfa that meets their requirements in one respect but is otherwise deficient, as they will pay for the alfalfa that fully meets the requirements of the No. 1 grade.

A grade of a farm product specifies in all cases the lower limits of market quality and may prescribe both upper and lower limits. These limits apply to one or more specified factors affecting the utility or commercial value of the product. The limits for a practical grade must be broad enough to avoid unnecessary technicalities and conform to trade practices. As a result there is sometimes some difference in value between commodities near the bottom of the grade and those that reach the top limits. The extent to which a grade reflects the relative value of the product depends upon the completeness with which it deals with the various factors influencing price and upon the range of quality permitted in any one grade. A practical grade must prescribe narrow enough limits in the range of quality to insure the buyer a product suited to his needs.

TESTING OF STANDARDS

Establishment of national standards for grades is a problem that goes far beyond a determination of a logical and scientific scheme of classification. The present standards for agricultural products as recommended or promulgated by the United States Department of Agriculture by no means necessarily represent the exact views of the bureau's staff. The individual grades have usually been based on the results of the departmental research but the final standards have frequently been modified substantially to meet the views of various groups in the industry. The Bureau of Agricultural Economics has served in the capacity of a fact-finding and coordinating agency, furnishing, as a result of much painstaking research, pictures of varied conditions and practices throughout the producing areas and in both foreign and domestic trade, and assisting wherever possible in harmonizing the divergent views of competing areas and interests.

Official standardized grades promulgated or formally recommended by the department have usually been subjected to extensive tests to determine their practicability under actual commercial conditions. The demand for grades for immediate use has frequently been met by issuing tentative grades which, although based on the best available information, have not been demonstrated practically. It is a commonplace among students of standardization as it applies to agricultural products that no grade developed under strictly laboratory methods will withstand the test of commercial usage with its

thousand and one unusual or unforeseen demands. It is true that nowhere outside of the laboratory could certain grading practices be satisfactorily analyzed and reduced to descriptive language.

But, after all, the proof of the grade is in its adaptability to commercial use, where it may be tested not only in the light of the theoretical soundness of the specifications but as to the ability of business men and their employees to understand and put it into actual operation. In many instances, before standards have been promulgated by the department, public hearings have been held in various parts of the country at which representatives of the trade and others interested have been invited to make suggestions and criticisms. This has been notably true of the standards for cotton, grain, hay, livestock, meat, and wool.

In the development of standards for a number of important commodities the United States farm products inspection service has rendered invaluable aid by using the standards as a basis of official inspection both at shipping points and in the receiving markets.

It is frequently necessary to provide more than one set of grades for the same product in order to evaluate it properly for certain specific uses. To illustrate, a medium-sized apple of very attractive color is more acceptable to the purchaser of dessert fruit than a larger but poorly colored apple of the same variety, and therefore it grades higher for that purpose. The reverse would be true if the fruit were sold for canning purposes, where the cost of peeling is a consideration and color is not. If the apples were to be manufactured into vinegar neither color nor size of themselves would affect value.

Similarly, a thin animal of good conformation is very desirable for feeding purposes but not for immediate slaughter.

Although the general advantages of uniform standards are well recognized in commercial circles, the following brief summary may be of interest to students of marketing.

Broadly considered, the purpose in establishing standards is to facilitate all of the marketing processes. Farm products may pass through many hands in moving from the centers of production to the wholesale markets. Many products are contracted for, for future delivery, and a large part of the business is transacted at long range. It is essential that there be a common language to insure mutual understanding between buyer and seller. But it usually is neither necessary nor desirable in such commercial transactions to require, in minute detail, specifications as to each factor influencing market quality. A general grouping of the product into grades of the same range of value or utility is usually sufficient. It is true that certain manufacturers of raw agricultural products require a personal inspection by their representatives, which accounts for a large volume of trading on the basis of samples in such products as cotton and tobacco.

The chief advantages of standardization may be considered in two groups: (1) The advantages of a common language between buyer and seller and other financially interested parties like banks that are interested in loaning money on warehouse receipts, and (2) the advantages of actually separating the product into different grades of market quality.

ADVANTAGES OF A COMMON LANGUAGE

The necessity for a common language is apparent as a basis for future contracts. This is particularly true in dealing in such commodities as cotton and grain where future trading is now well organized on the basis of definite specifications for each grade on which trading takes place. With such commodities as cotton linters, one of the first advantages of standard grades is found in the facilities they afford for the establishment of basic prices and differential quotations. With some other commodities, such as fruits and vegetables, where the industry does not deal in futures to such an extent but where the volume of trading conducted on this basis is by no means inconsiderable, a surprising amount of trading is still conducted on the basis of vague descriptions. This loose method of doing business has resulted in endless disputes in the event of a material drop or rise in the market.

Clear and definite grades are likewise indispensable in transactions through exchanges and in making telegraphic sales, sales in transit, or in any circumstances where the buyer can not exercise the privilege of inspection.

Standard grades facilitate the settlement of claims. Claims against the railroad companies for losses incident to the transportation of agricultural products run into millions annually. To arrive at a basis of adjustment it is necessary to establish the value of the product and to correlate the reported market prices with the specific lot on which the claim is sought. It is necessary to identify it in terms of standard grades. When evidence can be produced to show that a certain shipment was of grade U. S. No. 1 it is relatively easy to establish the prevailing price. The American cotton standards are now used practically throughout the world as the basis for arbitrating the disputes arising out of transactions in American cotton. (Fig. 1.)

Standard grades are necessary to permit an intelligent comparison of market prices. One of the first demands on the Bureau of Markets, now the Bureau of Agricultural Economics, for Federal standards came at the time of the organization of the telegraphic market news service for fruits and vegetables. This service was scarcely under way before it became evident that growers and shippers had no way of knowing whether variations in prices in the reporting markets represented differences in the market demand or merely differences in the actual quality of the product.

ADVANTAGES OF SEPARATING THE PRODUCTS INTO GRADES

Equally important advantages are to be gained by actually separating the product into different grades of market quality.

One of these benefits which is especially important in cooperative marketing associations is that it affords a basis for pooling the products of various growers to enable all to share alike in the season's sales. It is inevitable in the ordinary course of business that there will be poor sales, damage in transit, bad accounts, rejections, and allowances. If certain growers are asked to bear the losses while others, through no especial effort of their own, receive the benefit of the good sales and prompt settlements, there may easily develop a belief that the management is showing favoritism. This sentiment

is likely to result in the development of cliques and factions, which quickly destroy the morale of an association. But attempts to pool

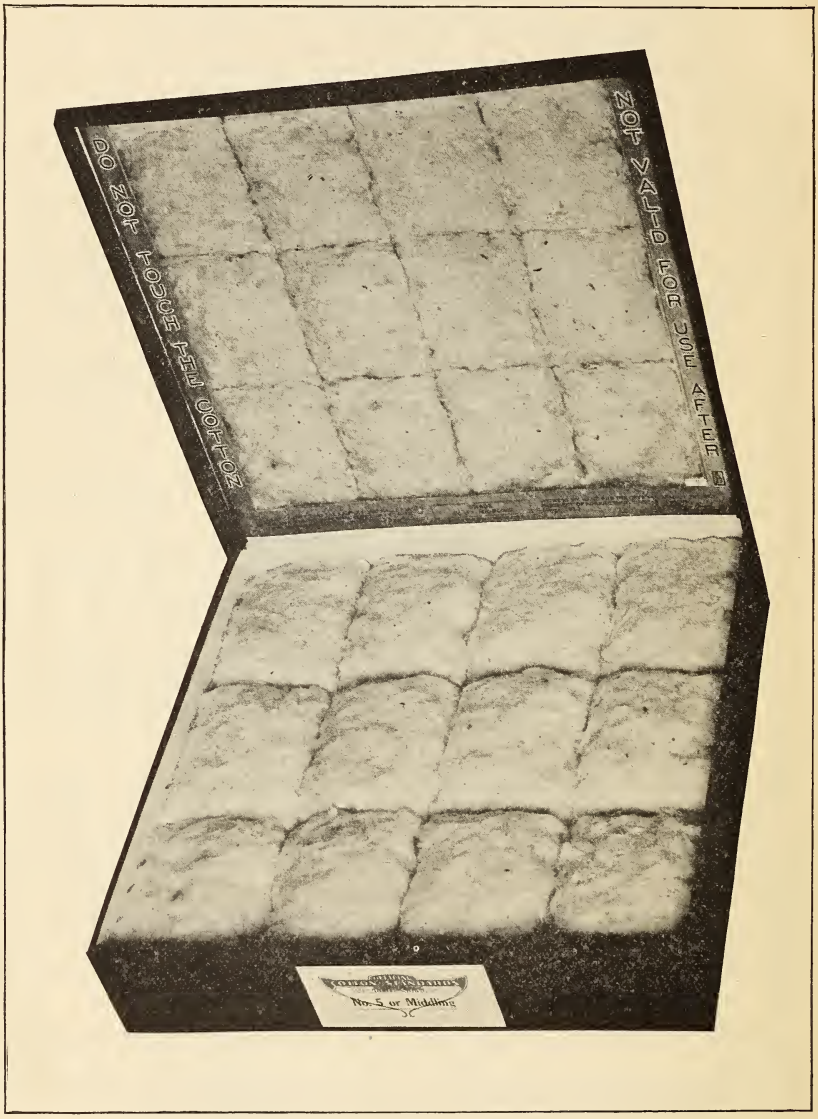

FIGURE 1.—Practical form of the universal standards for the grade of Middling cotton. In the upper half is a photograph, inserted in cover of the box, to verify the preparation of the cotton and the position of the leaf. At the bottom of photograph is the seal of the Department of Agriculture and the certificate and signature of the Secretary of Agriculture. Standards for the other grades and for color are represented in the same way

the products of the members without regard to variations in the grade have been uniformly unsuccessful.

Well-graded products make it possible to reduce distribution costs by eliminating waste both economic and physical. The manufacturer

finds it unnecessary to order 10,000 pounds of wool to insure receiving 5,000 of the quality he requires, and the dealer in fresh fruits and vegetables is not required to sort out and throw away produce that might have been used profitably in other markets or at some by-products plant but that is not suited to the demands of his particular trade.

Actual separation of the product into various grades also permits more effective distribution. Effective distribution consists in finding the market that will give the grower the largest return for his product. This involves: (1) Reaching the widest territory that transportation costs and the physical limitations of the product will permit; (2) extending the marketing season to allow the longest possible period of time to dispose of the crop; (3) conforming to trade preferences to meet the broadest range of consumer demands; and (4) reducing distributors' margins to a minimum.

In addition to the use of standard grades to bring about benefits incident to pooling and to secure more effective distribution, standardization is of fundamental importance in relation to such marketing functions as financing and advertising.

Warehousemen who operate under the provisions of the United States warehouse act are required to use official grades on the warehouse receipts if any grade is designated and if any grades have been established by the Government for the commodity in question. In the absence of Federal grades, the grades used must meet with the approval of the department. The purpose of the warehouse act is to enable producers to make a freer use of receipts as collateral for loans. The banker's location may be distant from the point where the products are stored. His only means of ascertaining the value of the products is to have a statement of the quantity and the grade of the products which are to constitute the collateral. If these receipts are to be accepted by the banks on the most favorable terms to the borrower, they must be dependable. The best way to secure this dependability is to place responsibility back of the warehouseman, and then to require the warehouseman to conform to recognized standards.

The desirability of standard grades as a basis for advertising is obvious. Advertising is worse than futile unless backed up by uniformly dependable products.

The application of standards exerts a direct and important influence on production and handling practices. Not only is the attention of the grower or shipper directed to his mistakes, thus setting him about correcting them, but he is also assured a proper remuneration for adopting more careful and effective methods. It has been a common observation in marketing all classes of agricultural products that where no standards are recognized the tendency of the trade is to pay a flat price based on the average value. There is certainly scant encouragement in this practice for the man who sacrifices yield for quality. Conversely, trading on a quality basis is the greatest stimulus to better methods of production, and definite uniform grades are the means to that end.

DEVELOPMENT OF FEDERAL STANDARDS

The following statements give briefly the outstanding points of interest in the development of Federal standards for the various

commodities. Those who wish to go further into the subject, who wish to know the work on any commodity in greater detail or to obtain the detailed descriptions or specifications of any standard, should write to the Bureau of Agricultural Economics, United States Department of Agriculture, Washington, D. C.

COTTON

Cotton grading, according to the best historical records, began in Liverpool about 1800. Until a few years ago its practice was limited almost entirely to persons engaged professionally in the cotton trade. Through commercial usage a system of grading grew up that was adopted by graders and spinners. Uniform grade names were used in American markets, but the qualities represented by these grades were not uniform. They varied both in different localities and from year to year, depending upon custom and the average quality of the crop.

Official standardization of cotton grades began in 1909. In that year the agricultural appropriation act contained an item for the express purpose of enabling the United States Department of Agriculture to undertake systematic work in cotton standardization and carried authority to establish official standards for the nine grades of white American cotton. Subsequent appropriations provided for the continuation and extension of this work. No authority was provided to apply the grades in any way or to entertain or determine any disputes in connection with their application. These permissive standards never came into commercial use.

Actual promulgation of United States standards representing these nine grades of upland white cotton was first accomplished under the United States cotton futures act on December 15, 1914. The use of these official cotton standards of the United States was made compulsory on the New York and New Orleans Cotton Exchanges under the provisions of the same act on February 18, 1915. The standards for yellow-tinged and yellow-stained upland cotton were promulgated January 28, 1916. The sea-island and American-Egyptian standards and the standards for length of staple were promulgated October 25, 1918. The sea-island standards were discontinued in 1925, as the production of sea-island cotton was discontinued.

On July 26, 1922, the Secretary of Agriculture signed an order revising the existing standards, effective August 1, 1923, the same date that the United States cotton standards act became operative. The standards established under the cotton futures act were made the official standards under the cotton standards act as well. Under the provisions of the latter act all transactions in interstate and foreign commerce and all published prices and quotations shall be based on the official grades unless the transaction be made in good faith on the basis of sample or private type and not in evasion of or substitution for the official standards.

Utilization of cotton in spinning depends largely upon its classification or, in technical language, upon its class. Class is the term used to express both the grade and staple length. Grade itself is a term denoting the composite of: (1) The color, luster, and brightness of the lint; (2) the nature and quantity of foreign matter present in the lint, such as leaf, dust, or other foreign matter; and

(3) the preparation or ginning. The staple length of cotton is the length of its fibers.

For convenience of arrangement, the subjects of grade, staple, and character are separately considered. Since the upland varieties constitute all but a small fraction of the American crop, the discussion relates particularly to upland cotton, as distinguished from American-Egyptian and sea-island cottons. The principles, nevertheless, that govern in the classification of upland cotton apply equally to cotton of any growth, and in treating the classification of the American-Egyptian and sea-island varieties it is necessary only to point out certain of their special characteristics that are different from those of the upland varieties.

The nine grades for upland white cotton are—

Middling Fair.
Strict Good Middling.
Good Middling.
Strict Middling.
Middling.
Strict Low Middling.
Low Middling.
Strict Good Ordinary.
Good Ordinary.

In addition, certain grades are provided for yellow-tinged, yellow-stained, and blue-stained cotton.

American-Egyptian cotton bears so little resemblance to the upland varieties that it can not be classed on the same standards. Under the cotton standards act five numerical grades are provided for the classification of American-Egyptian.

Practical forms of the standards for each grade are prepared for distribution as provided by the act. Each practical form consists of a box made of heavy cloth-covered pasteboard in which are placed samples of 12 bales, all of the same grade. To this box is attached a hinged cover, on the underside of which is mounted a photograph of the samples showing the size and position of the foreign matter originally present on the surface of the cotton and the quality of preparation. The photograph bears an imprint of the seal of the Department of Agriculture and a certificate of the Secretary of Agriculture dated and signed by himself or by another official designated for the purpose. The 12 samples that each box contains not only show the range or variation of leaf, color, and preparation allowed within that grade, but represent regional differences as well. For convenience of reference each sample is given a numbered position in the box.

As a general proposition it may be stated that the staple length of cotton is more important in a determination of its value than is its grade. Paradoxically, large quantities of cotton are bought and sold in the country markets as "average receipts" without any reference to staple, though in such cases the buyer knows from his current purchases about what proportion of the daily receipts are of the various staple lengths. Before such cotton reaches a mill, however, it passes through channels where it is carefully stapled, selected, and assembled in even-running lots.

Cotton is roughly divided according to its length into long staples and short staples. By custom, the dividing line is 1⅛ inches, cotton of that length and longer being known as long-staple cotton, extra-staple cotton, staple cotton, extra staples, or staples. Shorter lengths are referred to as short-staple cotton or short cotton. This line of

demarcation is recognized by many trade organizations in cases where separate sets of rules are made for trading in long-staple and short-staple cottons. The tendency in recent years, however, has been to acknowledge premium value in any cotton 1 inch or more in length, and the term short staple has come to be applied by common usage more particularly to cottons that are less than 1 inch in length of staple.

Official standards for staple were established under the cotton futures act on October 25, 1918, and practical forms of the standards are available for certain of these lengths. These standards for length are also the official standards under the cotton standards act. (Fig. 2.)

The length of cotton fibers is determined by pulling the staple. As every sample contains fibers of more or less varying length, the drawing out of representative fibers is a process involving much skill.

Of almost equal importance with grade and staple is the attribute of character, which refers to the strength, body, uniformity, and smoothness of the fiber. At the time of this writing no standards for character have been established.

The official cotton standards of the United States for American upland cotton were adopted by the leading cotton exchanges of Europe during the summer and fall of 1923, and an agreement was entered into between the United States Department of Agriculture and the European exchanges to facilitate the use of the standards in foreign commerce. This action followed a series of conferences in Washington between representatives of the United States Department of Agriculture and of the foreign exchanges. The European parties to the agreement were the following:

Liverpool Cotton Association (Ltd.).
Manchester Cotton Association (Ltd.).
Syndicat du Commerce des Cotons au Havre.
Bremer Bauumwollborse.
Associazione Cotoniera Italiana (now known as Associazione Italiana Fascista Delgi Industriali Cotonieri).
Association Cotonniere de Belgique. (The Marche de Coton a Gand is a party to the present agreements.)
Centro Algodonero de Barcelona.
Vereeniging voor den Katoenhandel te Rotterdam.
Federation of Master Cotton Spinners' Associations (Ltd.) of England.

The secretary's order of July 30, 1923, promulgating the revised standards, recited that since these standards had been agreed upon and accepted by all of the leading European cotton exchanges, they might be termed and referred to as universal standards for American cotton.

The agreement between the Department of Agriculture and the European exchanges or associations provided among other things:

(1) That the associations would make the universal standards the basis of all their contracts in which grades are specified for the purchase and sale of American cotton.

(2) That the original standards were to be kept by the Department of Agriculture at Washington, and that no practical forms or copies of the standards would be used except those prepared by the department.

(3) That during the time the agreement should remain in effect the Department of Agriculture would make no change or revision

of the standards unless such change or revision had been considered in a meeting which the associations had been given opportunity to attend.

It being the purpose of the department and the associations to establish and maintain the integrity, comparability, and uniformity of copies of the original universal standards, a supplemental agreement made provision for a meeting in Washington each year, beginning on the second Monday in March, the first such meeting to be held in 1925. It was provided that at such meetings each association might be represented by one or two experts in the classification of American upland cotton, and the United States was to be represented by as many experts as there were experts present representing the European associations who had signed the agreement. Each association was to have one vote and the United States a number of votes equal to the total number cast by the associations, and three-fourths of all the votes cast was to be required for any action.

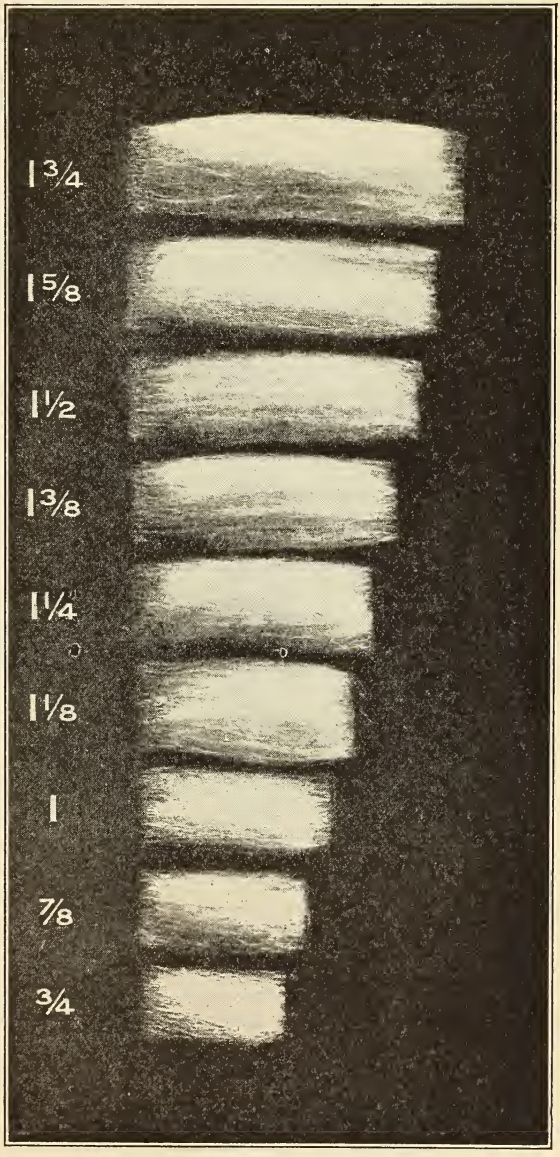

FIGURE 2.—A representation of some of the lengths of staple for which practical forms of standards are available

The sole purpose of the annual meeting provided for in the supplementary agreement was the examination and approval of 40 or more sets of copies of the original universal standards for the use of the United States and the associations during the year beginning on August 1 next following each meeting. (Fig. 3.)

The supplemental agreement was amended in 1925 to provide that thereafter instead of annual meetings in Washington there should be a meeting in Washington on the second Monday in March every two years, beginning 1927.

COTTON LINTERS

Standards for American cotton linters have also been provided under the provisions of the cotton standards act. These standards became effective August 1, 1926. Production has reached a total of approximately 1,000,000 bales yearly.

Grading of linters is based primarily on the different blends of the unginned cotton fibers and of the seed fuzz that are formed

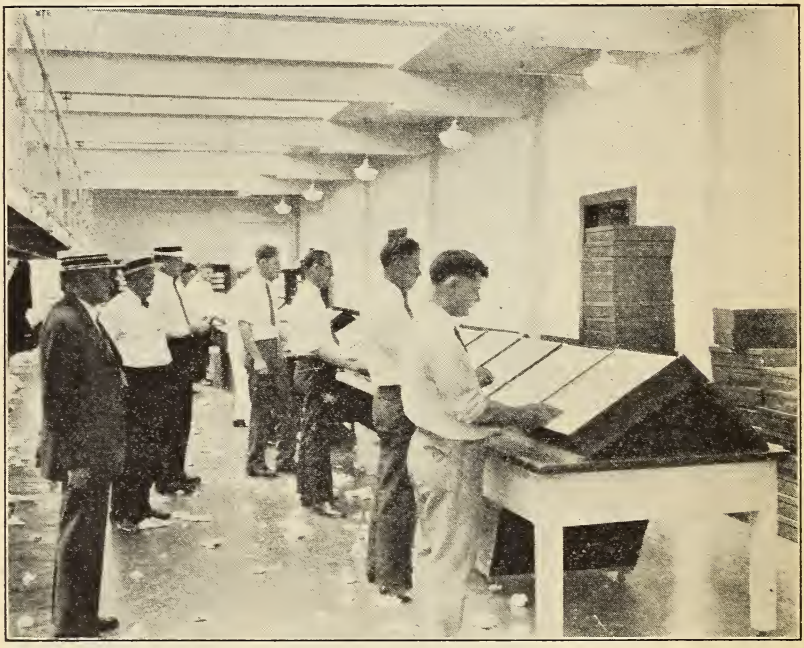

FIGURE 3.—Preparing practical forms of the universal standards for American cotton

during delinting, a process in conditioning the seed for oil extraction. These blends are directly correlated with the requirements of consumption. Standard grade No. 1 is composed chiefly of unginned cotton fiber and grade No. 7 is composed chiefly of the seed fuzz. The consumers of linters may be divided into three groups—spinners felters, and chemical users. Probably the largest consuming group at present is composed of the felters. This group includes the makers of batting, mattresses, cushions, wadding, paper, etc. It utilizes all grades of linters.

Linters containing the largest portion of long fibers are spun and made into cheaper grades of cloth, and twine, lamp wicks, etc. They are also bleached, sterilized, and batted for use as absorbent cotton or for other similar purposes.

In the chemical group are included all consumers that use cellulose as the base of their products. Cotton linters contain from 70 to 85 per cent of available cellulose. During the past decade the uses to which linters have been put by this group have made an unprecedented growth. New products are being discovered almost daily. The seed fuzz seems to be preferred for chemical purposes, especially since its low cost makes it compete favorably with other sources of cellulose. Standard grades Nos. 5, 6, and 7 are preferred by chemical consumers.

DAIRY AND POULTRY PRODUCTS

BUTTER

The first quality standardization work attempted by the department in the field of dairy and poultry products had in view the establishment of a uniform basis for the grading of butter and cheese. This work was begun in 1918. At that time, standards were used in all of the important receiving markets, but the terms were variously interpreted not only in different markets but by different operators in the same market. The standards developed by the department followed closely the established trade practice, but the grades were made much more definite and were applied uniformly in all markets by the Government graders.

The official standards for grading were promulgated under the provisions of the farm products inspection law. All research on these products has been authorized and financed under the item carried in the agricultural appropriation acts providing for investigating the marketing and distribution of farm products.

For the purposes of grading, butter is classified into six classes as follows: (1) Dairy butter, (2) creamery butter, (3) packing-stock butter, (4) ladled butter, (5) process or renovated butter, and (6) grease butter.

The quality of all classes of butter, except ladled, packing-stock, and grease butter, is determined by definition and is indicated by a score with maximum ratings given to various quality factors as follows:

Flavor	45
Body	25
Color	15
Salt	10
Package	5
Total	100

In actual official practice, the rating of each quality factor is somewhat modified to give proper recognition to actual market requirements. Each score is considered a grade and a certain standard is required for each of the five quality factors as shown in Table 1.

TABLE 1.—*Characteristics required or permitted in butter receiving certain scores*

Defined score	Flavor	Body	Color	Salt	Package
95 and above.	Desirable flavors: Fine, sweet, clean, with pleasing creamy aroma.	Perfect, firm, waxy.	Perfect light or medium.	Perfect light or medium.	Must be attractive, neat, clean, uniform and sound.
93–94	Desirable flavors: Fine, sweet, clean. Total defects other than flavor not over ½ point.	Firm	Light or medium.	Light or medium.	Free from mold, clean, uniform, and sound.
92	Desirable flavors: Sweet and clean (slightly storage flavor in held butter). Total defects other than flavor not over 1 point.	do	Light or medium, slight, curd specks or waviness.	Light or medium, well dissolved, uniform.	Clean, uniform, and sound.
91	Slight objectionable flavors, fairly sweet and fairly clean (storage flavor in held butter).	do	Light or medium, uniform, curd specks, waviness.	Light, medium, or high, well dissolved, uniform.	Do.
90	Objectionable flavors shown: Fairly sweet and fairly clean, may be flat and lacking in flavor (old flavor in held butter).	Fairly firm	Light or medium, fairly uniform, wavy.	Slightly gritty, fairly uniform.	Do.
89	Objectionable flavors permitted; reasonably sweet and reasonably clean.	Reasonably firm.	Light, medium, or high, distinct waviness.	Somewhat gritty, fairly uniform.	Uniform and sound.
88	Objectionable flavors distinctly developed; also unclean taint, musty, distinct lime or other alkaline flavors shown.	do	Slightly mottled.	May be gritty and somewhat irregular.	Do.
87	Garlic and off-flavors slightly evident.	Weak and considerably defective.	Distinctly mottled or streaked.	Gritty and irregular.	Do.
86	Garlic and off-flavors distinctly evident.	do	Very mottled, streaked, or high.	Irregular, extremely high, and gritty.	Do.
85	Pronounced garlic and off-flavors.	Weak, but must be fairly solid boring.	do	do	Do.
84–83	May be slightly rancid or strong on tops and sides.	May be ragged boring.	Very mottled, streaked, or extremely high.	Extremely high, irregular, and and gritty.	Do.
82–80	Rancid or strong on tops and sides.	do	do	do	Sound.
80–75	Butter containing defects of a more marked degree than specified above is given a score below 80, depending upon the extent of the defects.				

CHEESE

In the early history of the American cheese industry before modern transportation and cold-storage facilities were available, the season's production was kept in curing rooms at the factories and was not marketed until after it had been well cured.

Under present conditions, marketing methods have changed and wholesale cheese dealers in the producing sections and distributing

markets have provided facilities for holding cheese during the process of curing or ripening. Accordingly, the practice of curing cheese at factories has been gradually discontinued, and cheese is now marketed by the factories and often by country dealers in a fresh or unripened state.

Commercial grading of cheese has been based chiefly upon the personal preference or opinion of the grader, and the particular requirements or preferences of certain markets have also had an influence on the grading of cheese. The finer distinctions in quality generally have been given minor consideration, and ordinarily cheese having a firm body, either a close, medium-close, or medium-open texture, a mild or sharp clean flavor, the desired color, and good finish has been considered of "good" to "fancy" quality. The preference in body and color in various consuming markets has differed to a marked degree. In certain markets a cheese having medium-firm body and open texture can be sold more readily and at a higher price than a cheese of equal quality having a firm body and close texture.

Practically the same conditions have prevailed for color requirements of different markets. Not infrequently different prices are paid in the same market for cheese of the same quality which differs only in the degree of flavor because of the age or degree of ripening. It is obvious that, with such conditions existing, the grading certificate for a lot of cheese, to be of definite use and value to buyers and dealers, should not only state the score but also fully describe all the characteristics that determine certain market preferences, such as approximate degree of flavor (mild or sharp), color, and character of texture and body.

The quality of American Cheddar cheese is determined by definition and indicated by a score with maximum ratings given to the various factors as follows:

Flavor	30
Body and texture	40
Finish and appearance	20
Color	10
Total	100

The following grades are recognized for American cheese: U. S. Extra Fancy, U. S. Fancy, U. S. No. 1, U. S. No. 2, U. S. No. 3, and Culls. Each grade represents a 3-point range in score, Extra Fancy scoring 95 and above and Culls below 83. The characteristics required in cheese of certain scores or grades are shown in Table 2.

TABLE 2.—*Characteristics required or permitted in cheese receiving certain scores*

Quality factor		Score 95 and above U. S. extra fancy	Score 92 to 94, inclusive U. S. fancy	Score 89 to 91, inclusive U. S. No. 1	Score 86 to 88, inclusive U. S. No. 2	Score 83 to 85, inclusive U. S. No. 3	Score below 83 Culls
Factors	Rating						
Flavor	30	Very fine clean flavor, mild or aged. Highly pleasing flavor and aroma; very fully developed and especially pleasing to the taste and smell.	Fine flavor, fresh, mild or aged; clean and desirable flavor if mild or aged and clean in flavor if fresh.	Good flavor, fresh, mild or aged; fairly clean, but may be lacking in flavor; may show slightly objectionable flavor, such as slightly developed frosted-feed, weedy, heated, barny, or cowy.	Fair flavor, fresh, mild or aged; must be reasonably clean in flavor. May show objectionable flavors such as frosted-feed, weedy, barny, cowy, or heated, or a slightly developed acidy, bitter, or fruity flavor.	Poor flavor, fresh, mild or aged. Off flavors disagreeable to the taste permitted. May show distinct acidy, bitter, sour, fruity, or unclean flavors.	Very poor flavored cheese, fresh, mild or aged. May show pronounced off flavors, very disagreeable to the taste, such as pronounced acidy, rank, bitter, sour, fruity, stale, unclean, or rancid.
Body and texture	40	Close, medium close, or open texture. Must be smooth and silky, slightly translucent, meaty and waxy, without gas holes.	Close, medium close, or open texture. Must be good body if fresh, smooth and meaty if aged. Practically free from Swiss holes and entirely free from pin holes.	Close, medium close, or open texture. Fairly good body if fresh, fairly meaty and smooth if aged. May show a few Swiss holes but must be practically free from pin holes.	Close, medium close, or open texture. Reasonably good body if fresh and smooth if aged. Must draw a full plug. May show a few pin holes and be slightly corky slightly crumbly, or slightly pasty.	Close, medium close, or open texture. May be defective, somewhat ragged, pasty, crumbly, corky, or gassy.	Close, medium close, or open. May be very weak, ragged, pasty, crumbly, corky, gassy, or spongy.
Finish and appearance	20	Uniform in size, perfect in shape, even, dry, closed surfaces, square edges, neat and clean, without cracks or checks, and free from mold.	Uniform in size and shape, with even, dry, closed surfaces, square edges, well dressed, neat and clean, without cracks or checks, and fairly free from mold.	Fairly uniform in size and shape even dry surfaces, well dressed, fairly clean and sound, without cracks or checks, and reasonably free from mold.	Reasonably uniform in size and shape, fairly smooth even surfaces, reasonably dry and reasonably sound, without open cracks or rot spots in rind.	May be irregular in size and shape and show defects, such as open cracks or rind holes, soft rot spots, huffed or misshapen.	May be very irregular in size and shape and very defective, with huffed surfaces, soft rot spots, and cracks or holes in the rind.
Color	10	Uncolored or medium colored. Uniform and even and free from defect.	Uncolored or medium colored. Uniform and even.	Uncolored, medium or high colored. Fairly uniform and fairly even, with only slight waviness.	Uncolored, medium colored, or high colored. May be slightly streaked or very slightly acid cut.	May be irregular, extremely high, badly mottled, streaked, or distinctly acid cut.	May be very irregular, extremely high, very badly mottled, streaked, acid cut, or badly faded.

EGGS

Standardization of eggs is a relatively new development. Preliminary research was begun in the department in 1921, but it was not until 1924 that an official egg-grading service was offered in New York and Chicago. The United States quality standards and grades for eggs have been developed with a view to meeting the varying needs of the different branches of the trade—buyers, wholesalers, and retailers. (Fig. 4.)

The factors upon which the quality of individual eggs is judged are shell, air cell, yolk, white, and germ. There are seven subdivisions for quality: U. S. Specials, U. S. Extra, U. S. Standard, U. S. Trade, U. S. Standard Dirty, U. S. Trade Dirty, and U. S. Check or Crack.

The essential difference between the grades used by buyers, wholesalers, and retailers, is the permitted range of quality and tolerances. For example, a wholesale handler of eggs buying a carload lot of

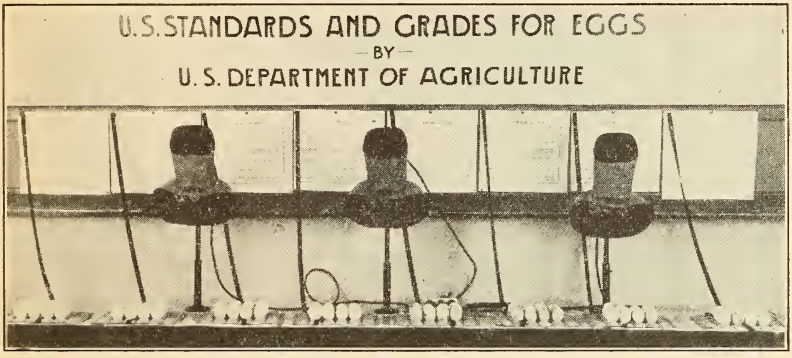

FIGURE 4.—An exhibit used to demonstrate the tentative egg standards. A statement of the requirements of each standard quality is connected with sample eggs of that quality, with candling devices for examination of the eggs.

U. S. Specials could not possibly secure a straight car of that exact quality. He must take some U. S. Extras and some U. S. Standards, and he must recognize the fact that in commercial candling operations mistakes in grading are inevitable and there is bound to be some loss. The wholesale grades therefore allow a tolerance or a certain percentage of lower-quality eggs.

Each wholesale grade is divided into two or more subgrades, which differ from each other in the percentage requirements of each quality. For example, the wholesale grade U. S. No. 1 Special must have at least 80 per cent Specials, and U. S. No. 4 Special requires only 50 per cent of this quality. (Table 3.)

Obviously a range of quality that would be satisfactory to the wholesaler would not be practical for the retailer, who must furnish the consumer with a product that is as nearly uniform in quality as possible.

The United States standards for eggs are relatively new, but there has been steady progress in the direction of their adoption by the trade. They have been adopted by a number of producers' associa-

tions and are serving as a basis for official grading which is being used rather extensively by governmental agencies and other public institutions that purchase on definite specifications.

DRESSED POULTRY

Standardized grades for dressed poultry were first formulated by the department in 1927. These were drawn up first for dressed turkeys owing to a demand for the grading of this class of poultry for the 1927 Christmas market. Immediately after, standards and grades were prepared for the other poultry classes. They are still in tentative form and subject to revision, as experience in their use is accumulated.

In addition to the common main classes of poultry recognized in the United States standards, namely, chickens, turkeys, ducks, guineas, and squabs, other classes or subclasses are provided. These main classes are subdivided according to age and sex; according to whether scalded, semiscalded, or dry picked; whether drawn or undrawn; whether milk fed or grain fed; whether fresh dressed, fresh hard chilled or frozen; whether dry packed or ice packed; and according to weight. For example there are dry-picked young tom turkeys, semiscalded milk-fed broilers, ice-packed scalded fowl or frozen young ducks.

Four United States standards of quality applicable to individual birds are provided for most of the subclasses of poultry. These in the order of their quality are known as U. S. Prime or No. A 1, U. S. Choice or No. 1, U. S. Medium or No. 2, and U. S. Common or No. 3; United States grades of the same names are provided for carcasses as commercially packed. In some of the subclasses such as cocks, stags, ducks, geese, guineas, and squabs, only three United States grades are provided, birds of the quality of U. S. Choice and U. S. Prime being grouped together as U. S. Prime and the quality U. S. Choice being omitted.

The principal factors taken into consideration in determining the quality of individual birds are fleshing condition, workmanship in dressing, condition of crop, and freedom from deformities and broken bones. In the highest quality, the carcasses must be full fleshed—that is, fully covered with flesh and fat. They must be well bled, free from pin feathers and skin tears or other dressing defects, and from deformities or broken bones. As the quality lowers in each successive standard, the fleshing may be less complete, and dressing defects and deformities of increasing seriousness are allowed. In connection with the United States grades for dressed poultry, weight specifications for individual birds and for packages of a dozen birds are suggested. Code words are also provided to make easy and economical the designation by wire of specific classes, qualities, and weights of dressed poultry.

Use of United States standards and grades for dressed poultry has been limited, to date, principally to dressed turkeys. During the fall and winter of 1929 about 8,000,000 pounds of dressed turkeys were graded in accordance with these standards, both at shipping points and at terminal markets. Most of the turkeys grading U. S.

MINI	S [4]		U. S. STANDARD DIRTIES [3]				U. S. trade dirties [4]	U. S. checks [4]
	3	No. 4	No. 1	No. 2	No. 3	No. 4		
	ent	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
U. S. specials--								
U. S. extras or								
U. S. standards								
U. S. trades or								
U. S. standard	ce.	50 Balance.	80 Balance.	70 Balance.	60 Balance.	50 Balance.		
U. S. trade dirt							50	
TOLERANCE O								
	en	*Dozen*	*Dozen*	*Dozen*	*Dozen*	*Dozen*	*Dozen*	*Dozen*
U. S. trades---								
U. S. checks---	12	1 9/12	1 2/12	1 2/12	1 2/12	1 2/12	3	
Stained or sligh								
eggs--------								
Stained or dirty								
	12	6						
Loss----	12	1 9/12	5/12	5/12	1 9/12	1 9/12	1 9/12	1 9/12

Size requirem

NOTE.—Weig
Factors of we

olesale produce and mercantile exchanges.

TABLE 3.—*United States wholesale grades for eggs*

MINIMUM PERCENTAGE	U. S. SPECIALS [1]				U. S. EXTRAS [2]				U. S. STANDARDS [3]				U. S. TRADES [4]				U. S. STANDARD DIRTIES [3]				U. S. trade dirties [4]	U. S. checks [4]
	No. 1	No. 2	No. 3	No. 4	No. 1	No. 2	No. 3	No. 4	No. 1	No. 2	No. 3	No. 4	No. 1	No. 2	No. 3	No. 4	No. 1	No. 2	No. 3	No. 4		
	Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
U. S. specials	80	70	60	50																		
U. S. extras or better	10	20	20	30	80	70	60	50														
U. S. standards or better	Balance.	Balance.	Balance.	Balance.	Balance.	Balance.	Balance.	Balance.	80 Balance.	70 Balance.	60 Balance.	50 Balance.										
U. S. trades or better													80 Balance.	70 Balance.	60 Balance.	50 Balance.						
U. S. standard dirties or better																	80 Balance.	70 Balance.	60 Balance.	50 Balance.		
U. S. trade dirties or better																					50	
TOLERANCE OR MAXIMUM ALLOWANCE PER CASE	*Dozen*	*Dozen*	*Dozen*	*Dozen*	*Dozen*	*Dozen*	*Dozen*	*Dozen*	*Dozen*	*Dozen*	*Dozen*	*Dozen*	*Dozen*	*Dozen*	*Dozen*	*Dozen*	*Dozen*	*Dozen*	*Dozen*	*Dozen*	*Dozen*	*Dozen*
U. S. trades	$1\frac{9}{12}$	$1\frac{9}{12}$	$1\frac{9}{12}$	$1\frac{9}{12}$	$1\frac{9}{12}$	$1\frac{9}{12}$	$1\frac{9}{12}$	$1\frac{9}{12}$														
U. S. checks	$1\frac{9}{12}$	$1\frac{9}{12}$	$1\frac{9}{12}$	$1\frac{9}{12}$	1	1	1	1	$1\frac{3}{12}$	$1\frac{3}{12}$	$1\frac{3}{12}$	$1\frac{3}{12}$	$1\frac{5}{12}$	$1\frac{5}{12}$	$1\frac{5}{12}$	$1\frac{5}{12}$	$1\frac{3}{12}$	$1\frac{3}{12}$	$1\frac{3}{12}$	$1\frac{3}{12}$	3	
Stained or slightly dirty eggs: U. S. standard dirties	$\frac{8}{12}$	$\frac{8}{12}$	$\frac{8}{12}$	$\frac{8}{12}$	$\frac{8}{12}$	$\frac{8}{12}$	1	1														
Stained or slightly dirty eggs: U. S. trade dirties	$\frac{4}{12}$	$\frac{4}{12}$	$\frac{4}{12}$	$\frac{4}{12}$	$\frac{4}{12}$	$\frac{4}{12}$	$\frac{8}{12}$	$\frac{8}{12}$														
Stained or dirty eggs: U. S. standard dirties									$1\frac{4}{12}$	$1\frac{6}{12}$	$1\frac{8}{12}$	$1\frac{10}{12}$										
Stained or dirty eggs: U. S. trade dirties									$\frac{8}{12}$	$1\frac{0}{12}$	1	$1\frac{2}{12}$	$1\frac{6}{12}$	3	$4\frac{6}{12}$	6						
Loss	$\frac{4}{12}$	$\frac{4}{12}$	$\frac{6}{12}$	$\frac{6}{12}$	$\frac{6}{12}$	$\frac{6}{12}$	$\frac{8}{12}$	$\frac{8}{12}$	$\frac{8}{12}$	$\frac{8}{12}$	$1\frac{0}{12}$	$1\frac{0}{12}$	$1\frac{0}{12}$	$1\frac{0}{12}$	$1\frac{0}{12}$	$1\frac{0}{12}$	$\frac{8}{12}$	$\frac{8}{12}$	$1\frac{0}{12}$	$1\frac{0}{12}$	$1\frac{0}{12}$	$1\frac{0}{12}$

Size requirements: (1) Uniform in size. (2) Reasonably uniform in size. (3) May be variable in size. (4) May be greatly variable in size.

NOTE.—Weight requirements for the wholesale grades will be such as are established by the wholesale egg trade for trading purposes.
Factors of weight and color of shell are not considered here, but are considered separately in connection with the formulation of trading rules for those grades that are adopted as trading grades by the wholesale produce and mercantile exchanges.

Prime or U. S. Choice were marked with their grade in such a manner that the grade was carried through to the consumer whose reaction to this grading was very favorable. Dressed poultry is also being graded in Washington, D. C. for Government departments on the basis of United States standards and grades, and this service will probably be extended to other large markets in the near future.

FRUITS, VEGETABLES, AND RELATED PRODUCTS

In 1915 the need for national standards for fruits and vegetables was forcibly drawn to the attention of the department through the inauguration of a telegraphic market news service. It was obvious that unless prices were based upon products of comparable quality no particular significance could be attached to price variations in the different markets. A staff of specialists was immediately assigned to the problem of formulating practical grades for the country as a whole.

The United States standards for potato grades were recommended for voluntary use in 1917, and in 1918 they were made compulsory by the United States Food Administration for all licensees. As these licensees comprised practically the whole produce trade of the country, the United States potato grades became the sole basis of trading for the remainder of 1918, after which time the Food Administration ceased to function.

A further and more permanent impetus was given the national standardization of fruits and vegetables through the inauguration of the food-products inspection service in the important distribution centers. The recommended standards of the department became invaluable as a basis of reporting the grade and quality of products arriving in these markets. The use of the standards was greatly increased in 1922 by the extension of the inspection service to points of origin.

So far as Federal requirements are concerned, the use of the United States grades for fruits and vegetables is wholly optional. The research and recommendations have been authorized by the various agricultural appropriation acts. The United States grades for potatoes and barreled apples have been promulgated by the Secretary of Agriculture as official standards for use in connection with the farm products inspection service. They have been widely adopted as the official standards in the various States, and in some cases their use has been made compulsory.

The terminology used in fruit and vegetable grading has been placed on a numerical basis with the exception of a certain premium grade provided for products of exceptional quality, which has been designated U. S. Fancy, and a U. S. Commercial grade for that quality of product that is better than a U. S. No. 2 but not so good as U. S. No. 1. The U. S. No. 1 grade is in all cases intended to include the major portion of the commodity that has customarily met the requirements of the best commercial grade. (Fig. 5.)

In general, the following factors are considered in determining the grade: (1) Variety; (2) market quality, based on the state of ma-

turity, general appearance, including desirability of shape and color and relative freedom from such defects as cause waste or unreasonable deteriorations; and (3) size.

In trading in these products it is necessary for buyers and sellers to specify either the specific variety, as "Winesap apples," or the type, as "round white potatoes." In some grades the minimum size of the product is specified, but where this is not the case the specifications must also be stated in addition to grade as "Winesap apples, U. S. No. 1, 2½ inches minimum."

Owing to the fact that fruits and vegetables are graded, packed, and branded at point of shipment and that subsequent deterioration is inevitable, such factors as overripeness occurring in storage or in transit are considered as affecting the condition rather than the grade. In reporting the condition of a lot of U. S. No. 1 Winesap apples showing 15 per cent overripe the usual practice is to state on the

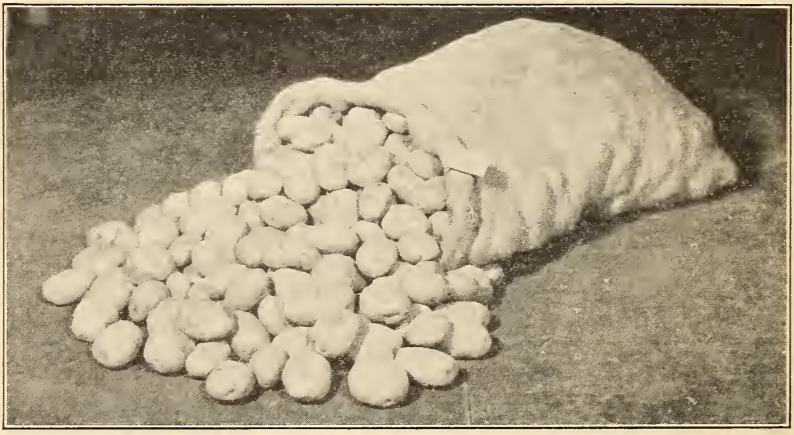

FIGURE 5.—A sack of U. S. No. 1 potatoes

inspection certificate, "Stock meets quality requirements of U. S. No. 1, overripeness being a matter of condition." The percentage of overripeness, together with other details of quality and condition is stated on another part of the certificate. Buyers must protect themselves in their contracts against deterioration after the time of packing, although in actual trade practice few acceptances are enforced of lots showing excessive deterioration.

The list of fresh fruits and vegetables for which Federal grades have been recommended has grown rapidly during the last few years and is being extended to cover all such products moving in carload lots. Standards have now been established for 42 fruits and vegetables. In the case of onions, for instance, separate standards have been established for Bermuda onions, Creole onions, and Northern-grown onions. Other similar cases raise the total number of sets of standards now devised for fruits and vegetables to 54 in 1930.

Table 4, which shows the specifications of the official standards for potatoes, illustrates a typical set of grades.

TABLE 4.—*Official standards for the inspection of potatoes, June, 1927*

Grade	Requirements					Tolerance for size, by weight	Tolerance for defects, by weight	Tolerance for soft rot (part of tolerance for defects)
		Sunburn, second growth, cracks, hollow heart, cuts, scab, blight, dry rot, disease, injury by insects, mechanical or other means	Dirt, foreign matter	Freezing injury and soft rot	Diameter			
					Inches	*Per cent*	*Per cent*	*Per cent*
U. S. fancy.	One variety, mature, bright, well shaped.	Free from	Free from	Free from	2 minimum	5	6	1
U. S. No. 1.	Similar varietal characteristics, not baldy misshapen.	Free from damage.	Free from damage.	---do---	(R) 1⅞" minimum (L), 1¾" minimum.[2]	5	[1]	1
U. S. No. 2.	Similar varietal characteristics.	Free from serious damage.	No restriction.	---do---	1½" minimum.	5	6	1

[1] 5 for hollow heart; in addition to 6 for other defects.
[2] See section on definition of terms below.

DEFINITIONS OF TERMS

POTATOES

"Mature" means that the outer skin (epidermis) does not loosen or "feather" readily during the ordinary methods of handling.

"Bright" means free from dirt or other foreign matter, damage or discoloration from any cause, so that the outer skin (epidermis) has the attractive color normal for the variety.

"Well shaped" means the normal typical shape for the variety in the district where grown and free from pointed, dumb-bell shaped, excessively elongated, and other ill-formed potatoes.

"Soft rot" means any soft or mushy condition of the tissue such as slimy rot, wet fusarium or wet breakdown following freezing injury or sunscald.

"Free from damage" means that the appearance shall not be seriously injured and that the appearance shall not be injured to an extent readily apparent upon casual examination of the lot and that any damage from the causes mentioned can be removed in the ordinary process of preparation for use without appreciable waste in addition to that which would occur if the potato were perfect. Loss of outer skin (epidermis) shall not be considered as an injury to the appearance.

"Badly misshapen" means of such shape as to cause appreciable waste in the ordinary process of preparation for use in addition to that which would occur if the potato were perfect.

"Free from serious damage" means that any damage from the causes mentioned can be removed by the ordinary process of preparation for use without a waste of 10 per cent or more of the total weight, in addition to that which would occur if the potato were perfect.

"Diameter" means the greatest dimension at right angles to the longitudinal axis. The long axis shall be used without regard to the position of the stem.

Lots of potatoes which are not less than 1½ inches in diameter and which meet the remaining requirements of U. S. No. 1 grade may be designated "U. S. No. 1, 1½ inches minimum."

The operation of the farm-products inspection service at shipping points has proved of exceptional value in testing the practicability of new grades. Not only has it afforded an opportunity to apply the grades on a commercial basis to a large volume of the various products, but in each case the actual application of the grades has been made by trained inspectors working under close supervision. During the fiscal year ended June 30, 1929, a total of 266,831 cars were inspected in cooperation with various State agencies, and a large proportion were certified on the basis of Federal standards. (Fig. 6.)

In 1926, 23 States had officially promulgated one or more sets of United States grades for fruits and vegetables as the official State standards.

PRODUCTS FOR CANNING

The most recent development in fresh fruit and vegetable standardization has in view the establishment of grades that will serve as a basis of contracts between growers of canning products and the commercial canners. United States grades have been recommended for apples, tomatoes, and spinach for canning purposes. One of the difficulties in connection with this standardization problem has been the necessity of formulating grades that could be applied by inspectors without slowing down the unloading operations. This difficulty has been largely overcome, and the United States grades have proved to be thoroughly practical under commercial operations. They are meeting with increased favor among canners and growers, who use them as bases of contracts for their products.

FIGURE 6.—A Federal inspector examining boxed apples at receiving market

Canning products are not usually sorted by the growers into different qualities; only the culls are removed, and the remainder is delivered to the cannery where the percentage of each grade is determined by inspection. This refers to the practice where official grades are used.

A study of the grading of Magnolia figs has also resulted in the preparation of tentative grades for canning stock applicable particularly to conditions in Texas. This work is still in a preliminary stage.

PEANUTS

Official standards for both shelled and unshelled white Spanish and shelled Georgia runners have been in successful use for several seasons.

The standards for unshelled or farmers' stock have been used chiefly as a basis for the statement of grade on warehouse receipts. The factors that determine the grade are maturity, dryness, and freedom from damage, together with the percentage of U. S. No. 1 shelled peanuts as determined by a cracking test.

The standards for shelled stock have been adopted by the Southeastern Peanut Association and are used as the basis for all arbitration and adjustments.

The U. S. No. 1 grade of shelled peanuts applies to whole peanuts that are not badly shriveled or noticeably discolored and that contain no unshelled or damaged stock and are free from foreign material.

The United States grades for shelled white Spanish and runner peanuts have been used extensively in receiving markets as a basis of official inspection by the United States farm products inspection service. An average of 1,270 cars have been certified as to grade during the past three years.

A survey and preliminary study of the grading of the large Virginia-type peanuts resulted in the recommendation of United States grades for farmers' stock. These grades have not secured the support of the trade. In fact, the whole idea of national standardization has met with strong opposition from many shellers and cleaners of Virginia-type peanuts who prefer to transact business as they have in the past on the basis of local grades.

HONEY

In spite of the economic importance of the honey industry, little has been done thus far in securing the effective application of uniform standards on a nation-wide basis.

The first research of the department was conducted jointly by the bee-culture laboratory of the Bureau of Entomology and the Bureau of Agricultural Economics, and had as its objective the adoption of color standards for extracted honey. A scientific analysis was made of honey samples from all parts of the country, and a technical basis was thus provided for describing the various gradations of color. After many unsuccessful attempts, a practical grader, extremely simple in principle and operation, was developed, which permitted the following color classifications: Water White, Extra White, White, Extra Light Amber, Light Amber, and Amber. The color of darker honey is of little commercial importance. The recommended standards of the department include, in addition to color, specifications as to clearness, density, floral source, and flavor.

Grades have also been formulated for section comb honey and for shallow-frame comb honey and cut comb honey. The factors determining the grade of comb honey are: Surface color of the comb, firmness of attachment of the comb to the section, floral source, freedom from pollen cells or damage caused by granulation, honeydew, or any objectionable flavor. There are also requirements as to the color of the section, the height of the comb, and freedom from any injury that would result in leaky or weeping sections.

The United States honey standards are the usual basis of inspection under the provisions of the farm-products inspection law.

The recommendations have met with general approval from the industry, but the task of securing their effective application in actual commercial operations lies ahead.

CONTAINERS FOR FRUITS AND VEGETABLES

Standard containers for marketing fruits and vegetables are of more interest to the average citizen than he generally realizes. He is at all times a consumer of some commodity and may be a grower or shipper of other commodities, a manufacturer of containers, or an official of a railroad, steamship line, or other carrier. As a consumer he is frequently defrauded by the substitution of short-measure packages at the full-measure price. The cost of marketing is increased by the greater expense of manufacturing a large number of styles and sizes and by breakage in transit, which may be due to weak packages, to improper stowage, or to the difficulty of loading odd-sized containers.

Standardization means to the manufacturer that production is simplified and that he can concentrate on a few sizes, with consequent lowering of costs. To the carrier it means the elimination of many sizes that now complicate the problem of damage in transit, and it narrows the container problem to a few sizes for which standard strength specifications can be worked out and approved methods of stowing and bracing can be devised. The grower or shipper benefits by any action that lowers the cost of manufacture and tends to reduce breakage in transit. In addition, standard containers provide him with a definite basis of sale so far as the size of his package is concerned. He is thus relieved of unfair competition through use by his competitor of a short package.

Three Federal laws have made certain standard containers compulsory for the marketing of fruits and vegetables. These are the United States standard barrel act and the standard container acts of 1916 and 1928.

The first of these, the standard barrel act, passed in 1915, established the standard fruit barrel of 7,056 cubic inches and its subdivisions, and the standard cranberry barrel of 5,826 cubic inches and its subdivisions. The standard fruit and vegetable barrel, which is ordinarily supposed to contain 3 bushels, actually holds 9 quarts in excess of that quantity. In establishing this standard, theoretical considerations were laid aside and the same dimensions and capacity as those of the flour barrel were adopted. The standard cranberry barrel was designed to hold 100 pounds of cranberries. The subdivisions of both barrels are three-quarter barrel, one-half barrel, and one-third barrel. The standard barrel act is enforced by the Bureau of Standards of the United States Department of Commerce, and in those States that have legally adopted the Federal standard by the local sealers of weights and measures. The law has been reenacted by at least 17 States and by the District of Columbia.

Closely following the adoption of the standard barrel act, the standard container act of 1916 was passed in 1916. This legislation established three standard sizes of Climax or grape baskets of 2, 4, and 12 quarts capacity, and standard berry boxes and till baskets containing dry one-half pint, dry 1 pint, dry 1 quart, and multiples

of the dry quart. A large number of unnecessary sizes of these containers was eliminated by this act, the reductions amounting to 82, 84, and 93 per cent for berry boxes, till baskets, and Climax baskets, respectively. (Fig. 7.) This simplification of sizes has improved marketing conditions for the produce shipped in these containers because there is now no question as to the size of the containers. It works to the benefit of growers, shippers, and consumers. To the manufacturer it has meant a reduction in the number of forms necessary to supply his customers, the possibility of making up stock in advance of orders, and extension of his market, because the containers which he now makes are in use the country over.

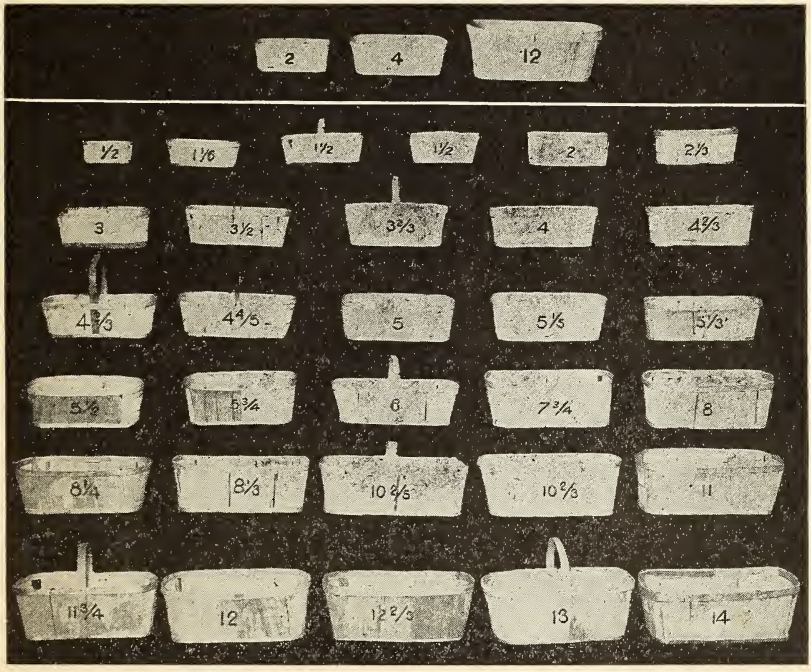

FIGURE 7.—Above, 2, 4, and 12 quart Climax or grape baskets. Shipments of other sizes in interstate trade are prohibited by law. Below, 31 types of Climax baskets in general use in 1917, before the establishment of standards

The material benefits accruing from the standard container act of 1916 resulted in a demand for and the ultimate passage in 1928 of the second standard container act. This act fixes the standard sizes of hampers and round stave baskets, including the type known as "straight side" or "tub" baskets, and splint baskets. Nine standard sizes of hampers and round stave baskets are provided—⅛, ¼, ½, ⅝, ¾, 1, 1¼, 1½, and 2 bushels. Splint baskets are standardized in six sizes of 4, 8, 12, 16, 24, and 32 quarts capacity.

In addition to establishing standard sizes of these containers the act of 1928 provides that the containers shall not be of deceptive appearance. It requires manufacturers to submit to the Secretary of Agriculture for approval the specifications for each container to be

manufactured and directs that such specifications shall be approved providing containers made in accordance therewith are of proper cubical capacity and are not deceptive in appearance. Under this provision the specifications for each size must necessarily be held within restricted limits of variation on account of the large number of standard sizes. This regulation has resulted in a large degree of uniformity in the dimensions and shape of each standard size.

The dry quart with its subdivisions and multiples is a satisfactory basis for standardizing such small containers as the berry box and small till basket. It has also been used as the basis for standardizing splint baskets. But although small sizes of hampers and round stave baskets are in more or less common use in some sections the larger sizes predominate both in number and importance, and these containers have been standardized on the basis of the standard bushel of 2,150.42 cubic inches, which has been commonly known and referred to as the Winchester bushel.

Some confusion has always existed as to what constitutes a bushel, as evidenced by the terms "struck bushel," "heaped bushel," and "weight bushel." The last two are arbitrary standards, varying in different localities, and their use was one of the causes of the unsatisfactory conditions that formerly prevailed. In establishing the standard bushel of 2,150.42 cubic inches, struck measure, the act of 1928 definitely disposes of both of those spurious standards as far as fruits and vegetables are concerned, since the law has been construed as making inoperative the State laws that establish weights per bushel so far as they affect fruits and vegetables packed in containers standardized by the act. The act, having been enacted under the weights and measures provisions of the Constitution, applies with equal force to intrastate and interstate transactions.

The fallacy of the "heaped bushel" is easily demonstrated. A standard unit of measure should be permanent, definite, and of fixed and uniform value. The heaped bushel is far from being fixed and in many instances the heap has practically disappeared. In those States in which an attempt has been made to define a heap, the phraseology is vague and indefinite. It has been referred to as a cone, the base being the top of the measure and the height depending on the nature of the article when "piled as high as may be without special effort or design." Under this definition such vegetables as sweetpotatoes might be piled so high that the heap would be as large as the measure itself. In certain States in which determined efforts have been made to secure a proper heap, dealers have provided themselves with measures of smaller diameter. Obviously, the smaller the diameter of the measure the smaller the heap. In shipping packages with covers the heap must necessarily be eliminated. The State of New York recognized these objections and repealed its laws requiring certain commodities to be sold by heaped measure before the act of 1928 was passed.

GRAIN

Grain grading has developed over a period of 75 years. For the greater part of this time the utmost confusion existed in the trade because there was no uniformity of grades or of their application.

The leading grain-producting States had grades, and in addition many boards of trades and chambers of commerce adopted their own grades and controlled the grading of incoming and outgoing shipments. The diversity of opinions regarding moisture content, for instance, serves to illustrate the nature of the difficulties that were constantly arising. This factor is of great importance in grading grain, for upon the degree of dryness more than anything else depends the keeping quality in storage and transit. The terms then in use such as dry, reasonably dry, damp, and wet, were susceptible of various definitions and meant one thing to the buyer and another to the seller. Investigations of the department showed that hard winter wheat showing 15 or 16 per cent moisture was being certified as dry, with the result that complaints were coming from grain exchanges and American consuls in European countries to the effect that wheat from the United States was arriving in a heated, musty, and damaged condition.

The sentiment of the grain trade finally crystallized in favor of the establishment of national standardized grades, with the result that in 1916, the United States grain standards act was passed by Congress. For a number of years prior to this time standards for corn and wheat had been a subject of departmental research. It was therefore possible to establish official standards for shelled corn. effective December 1, 1916, and to follow these with standards for winter and spring wheat during the following summer.

The orginal standards have been amended from time to time to meet more exactly the requirements of the industry. Under the provisions of the same act official standards have been promulgated for oats, rye, grain sorghums, feed oats, mixed feed oats, and barley.

In addition to these standards, research has proceeded in the grading of milled, brown, and rough rice and, under the general investigational and inspection authority of the department, permissive official standards have been established by the Secretary of Agriculture for each of these products. The rice standards are now being applied under joint Federal-State rice-grading services in two States, by grading agencies of rice associations and chambers of commerce, and by the rice trade.

Generally speaking the factors that determine the commercial grade of grain are class, moisture content, weight per bushel, freedom from foreign material and other grains or other classes of the same grain, damaged kernels, in certain cases—color and texture of kernels, freedom from objectionable dirt, and general condition—that is, whether the grain is cool and sweet or whether it is musty, sour, heating, or hot. These are the factors of prime importance for commercial trading purposes, which are all summed up in one trading term—the grade designation.

For standardization purposes grains are divided first into classes and in some cases into subclasses. For example, wheat falls into five classes as follows: Hard Red Spring, Durum, Hard Red Winter, Soft Red Winter, and White wheat. In each of these classes there are two or more subclasses.

The official grain grades are designated by number, accompanied by the name of the class or subclass. There are five numerical grades

of wheat and an additional grade, known as Sample grade, which is provided for off-grade grain that is usually sold subject to inspection of the buyer. Table 5 of grades for Hard Red Spring wheat is typical.

TABLE 5.—*Grade requirements for—(a) dark northern spring, (b) northern spring, (c) red spring wheat*

Grade No.	Minimum test weight per bushel	Maximum limits of—						
		Moisture	Damaged kernels		Foreign material other than dockage		Wheats of other classes	
			Total	Heat damage	Total	Matter other than cereal grains	Total	Durum
	Pounds	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
1 [1]	[1] 58	14.0	2	0.1	1	0.5	5	2
2	57	14.5	4	.2	2	1.0	10	5
3	55	15.0	7	.5	3	2.0	10	10
4	53	16.0	10	1.0	5	3.0	10	10
5	50	16.0	15	3.0	7	5.0	10	10
Sample grade	Sample grade shall be wheat of the subclass dark northern spring, or northern spring, or red spring, respectively, which does not come within the requirements of any of the grades from No. 1 to No. 5, inclusive, or which has any commercially objectionable foreign odor except of smut, garlic, wild onions, or is very sour, or is heating, hot, or is otherwise of distinctly low quality, or contains small, inseparable stones, or cinders.							

[1] No. 1 hard spring shall consist of 85 per cent or more of dark, hard, and vitreous kernels and shall have a test weight per bushel of at least 60 pounds. In all other respects the requirements for this grade are the same as for the grade No. 1 dark northern spring.

(1) The wheat in grades Nos. 1 to 4, inclusive, shall be cool and sweet.

(2) The wheat in No. 5 shall be cool, but may be musty or slightly sour.

(3) The wheat in grade No. 1 hard spring, in grade No. 1 dark northern spring, and grade No. 1 northern spring may contain not more than 5 per cent of the hard red spring wheat variety Humpback.

Special wheat grades are provided for mixed wheat, mixed durum, for treated, garlicky, smutty, and weevily wheat. The rule for inspecting these grades is to determine the grade in the usual manner and then add the special designation, as No. 1 red spring weevily.

In the case of wheat, rye, and certain classes of barley, the grades provide for a dockage system whereby foreign material that can be readily removed by the use of appropriate cleaning devices is separated from the grain before many of the other grading tests are performed. The dockage content is assessed by weight in terms of whole per cent and is added to the grade designation. (Fig. 8.)

Dockage in wheat includes sand, dirt, weed seeds, weed stems, chaff, straw, grain other than wheat, and any other foreign material that can be removed readily from the wheat by the use of appropriate sieves, cleaning devices, or other practical means suited to separate the foreign material present; also undeveloped, shriveled, and small pieces of wheat kernels removed in properly separating the foreign material, and that can not be recovered by properly rescreening or recleaning.

After the preparation and establishment of grain standards there still remains the task of securing their correct and uniform appli-

cation by inspectors. This calls for additional instructions and regulations governing the methods and bases of determinations. The wheat standards contain the following provisions:

Each determination of dockage, moisture, temperature, odor, onions, garlic, and live weevils or other insects injurious to stored grain is made upon the basis of the grain including dockage. All other determinations are upon the basis of the grain when free from dockage.

In addition, interpretative opinions, accompanied by practical examples illustrating the particular point involved, are issued from time to time by the board of review, a body constituted for the purpose, regarding those factors which are determined not by mechani-

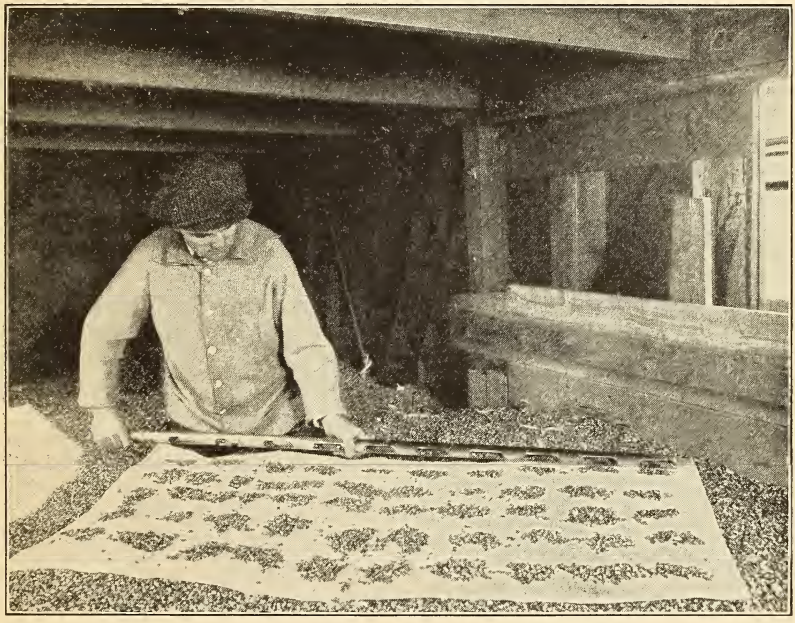

FIGURE 8.—Obtaining a representative sample of grain from car for inspecting and grading the grain

cal apparatus but by the exercise of individual judgment and concerning which there may be room for honest difference of opinion between experienced and well-informed grain specialists.

An outstanding development in the merchandising of wheat is the important part that protein determination has assumed in recent years. The test for protein is not one of the factors of the wheat standards. The services of a trained chemist are required to make the determination, which is regarded as an adjunct or supplement to present-day commercial grain inspection and grading. The Department of Agriculture has not set up a Federal service for protein testing, but its research chemists have taken an active part in the standardization of methods, equipment, and technic, with a view to bringing about a closer uniformity of results on the part of pri-

vate chemists, State chemists, and chemists of boards of trade now performing the test for commercial transactions.

The administration of the grain standards act, under general supervision from Washington, is directed by general field headquarters at Chicago, through Pacific coast field headquarters at Portland, Oreg., through 5 division supervisors, 35 district offices of Federal grain supervision, and 5 branch offices.

HAY AND RELATED PRODUCTS

HAY

The hay standardization studies of the Bureau of Agricultural Economics began in 1920. Thousands of representative samples of baled timothy and clover hay were assembled at the shipping points and in the markets for examination and laboratory study.

For several years the acts of Congress making appropriations for the Department of Agriculture have authorized the Secretary of Agriculture to acquire and diffuse among the people of the United States useful information on subjects connected with the grading of farm products and to establish an inspection service for certain farm products. Under the above authority, standards were recommended for timothy, clover, and grass hay on January 2, 1923. Standards for alfalfa and alfalfa mixed hay, Johnson and Johnson mixed hay, prairie hay, and mixed hay were recommended on July 1, 1925, and the standards for timothy, clover, and grass hay were revised slightly on the same date. On September 1, 1925, the Secretary of Agriculture made these standards the official standards of the United States for the inspection and certification of such hays. After two seasons of practical experience with the official standards in a number of technical markets and shipping points, a few minor revisions and additions were made to complete a set of national standards that were made official and effective July 1, 1927. Further minor revisions were made in these standards effective November 1, 1929, and tentative standards for soybeans and soybean mixed hay were announced in November, 1928.

United States hay standards comprise standards for six major groups of hay: Group I—timothy and clover hay; Group II—alfalfa and alfalfa mixed hay; Group III—prairie hay; Group IV—Johnson and Johnson mixed hay; Group V—grass hay; and Group VI—mixed hay. These groups do not include grain straw and the straw of hay plants threshed for seed. For the purposes of the standards, hay is confined to cured forage that is specifically classified and described in each group, which has recognized feeding value, which is not coarse and woody, and which does not contain more than 35 per cent of foreign material.

These groups, with the exception of grass hay and mixed hay, are based on the combinations of various kinds of hay commonly found in association in the chief areas of production and the chief markets of the United States. Timothy and clover hays, for example, belong in one group because such kinds of hay are grown in quantity in the same geographic regions and often in mixtures with each other. The groups alfalfa and alfalfa mixed hay, prairie hay and Johnson and Johnson mixed hay are founded on similar conditions and facts.

Grass hay is hay in which the grasses other than timothy, Johnson grass, upland and midland prairie grasses, or grain cut for hay strongly predominate, thus giving the hay a grassy appearance.

Mixed hay comprises combinations of the various kinds of hay included in United States standards that are not as definitely recognized in hay-marketing practice as the combinations specified in the various classes of hay in Groups I, II, III, IV, and V.

Additional hay groups, such as soybean hay, grain hay, and Lespedeza hay, or other kinds of hay that may develop in commercial importance, will be brought under United States standards from time to time.

Each of the groups timothy and clover hay, alfalfa and alfalfa mixed hay, prairie hay, Johnson and Johnson mixed hay, and grass hay in United States standards has its classes, grades, and definitions.

In all United States hay standards the term "class" is used to describe the kind of hay or the mixtures of various kinds, and has no reference whatever to quality or condition. Class names, such as timothy, clover, alfalfa, timothy light clover mixed, etc., are as descriptive of the kinds and mixtures of hay as necessary terseness will permit. The first word in each class name usually indicates the kind of hay that predominates in that class. Succeeding words, if any, in the class names indicate the kind of hay mixed with the predominating kind and whether the mixture is comparatively light or in a quantity too great to be considered as a light mixture. The following example will serve to illustrate the descriptive character of the class names. The class name, Timothy Light Clover Mixed, plainly describes a hay mixture in which the timothy predominates and in which the clover portion is of minor importance.

Each class of hay in the United States standards is based upon definite specifications for the mixtures permitted as shown in the column entitled "Mixture percentages." The class specifications must be interpreted through the definitions accompanying the standards for each group in order to understand fully the class requirements. For example, the words timothy, clover, grasses, alfalfa, etc., appear constantly in the class specifications, and for the purposes of these standards these words are accurately defined under the definitions for each group of standards and the tentative standards for soybean and soybean mixed hay.

The various classes of hay in United States standards have been designed to include the well-defined kinds and mixtures of hay that are of chief commercial importance in the United States. The great majority of hay markets and shipping points, considered separately, can make use of but a few of these hay classes, because a class of hay such as Alfalfa Light Johnson Mixed, common in the South Atlantic States, is unknown in the Middle Western States, or Alfalfa Light Grain Mixed, common in the Pacific Coast States, is unknown in the North Atlantic States. The hay classes in United States standards are national in scope, and each market or producing district will use such classes as are of local importance.

In all United States hay standards the term "grade" is used to describe the quality of hay. The quality varies in all classes of hay, according to the conditions under which the hay was produced. Each

class of hay, except Midland Prairie in the prairie hay standards, is divided into three numerical grades, namely: U. S. No. 1, U. S. No. 2, and U. S. No. 3, each such grade having different quality requirements. In all classes there is a Sample grade for inferior hay not good enough for the numerical grades.

In the prairie hay standards there are but two numerical grades for the class Midland Prairie. No No. 3 grade is provided because when Midland Prairie hay is so damaged as to have less than 35 per cent green color the hay trade has considered it usually as packing hay rather than feeding hay. Thus in the United States standards, when Midland Prairie hay has less than 35 per cent green color, it is graded as sample grade.

In the timothy and clover hay, Johnson and Johnson mixed hay, prairie hay, and grass hay standards, color is the most important grading factor, and foreign material is a grading factor of secondary importance. In the alfalfa and alfalfa mixed hay standards and the tentative standards for soybean and soybean mixed hay grading factors are leafiness, color, and foreign material, of which leafiness is the most important.

The numerical grades and Sample grade define the quality and condition of the greater part of the hay crop of the United States. They have been designed to cover the common run of the good, fair, and poor quality hay in the trade in a definite and practical manner. In United States standards the numerical grades are supplemented with special grades to describe and emphasize the unusual superior or inferior qualities of certain kinds of hay.

United States hay standards recognize the fact that certain characters, as exceptional leafiness in alfalfa hay and exceptional green color in all kinds of hay, affect palatability and feed value and thus create price differentials from the average of the common run of hay. These exceptional characters occur in but a small part of the hay crop, and can not be used as practical grading factors on a common basis with the color, leafiness, and foreign-material specifications employed in the grading of common-run hay. They must be described in a specific manner in the inspection and grading of hay, otherwise wide spreads of value and price would occur occasionally in the same grade.

This problem of describing and emphasizing the exceptional leafiness, color, and texture characters of hay and the leafy or green character of certain types of No. 2 and No. 3 and Sample grade alfalfa hay is met, in United States standards, by the use of special grades entitled "Grades for extra leafy hay," "Grades for extra green hay," "Grades for coarse hay," "Grades for fine Johnson hay," "Grades for leafy hay," and "Grades for green hay," which appear in paragraph form after the tabulated standards for each group. These special grades are so arranged that the designation for the special grade may be included with the numerical grade and made a part of the complete grade designation. For example, a lot of hay classing as alfalfa which meets all the requirements of the No. 1 grade and in addition thereto has an exceptional quantity of clinging foliage is graded U. S. No. 1 Extra Leafy Alfalfa instead of U. S. No. 1 Alfalfa, which would be the grade designation in case no special grades were available for extra leafy hay.

These special grades in United States standards are to be considered as terse descriptions of the unusual superior or inferior characters in hay, which may be employed when necessary to supplement the numerical grade description and to differentiate such hay from the common run of hay that is described by the numerical grades.

Prior to 1925, the hay-inspection service was limited because standards were available only for timothy and clover hay. The publication of standards for alfalfa, prairie, and Johnson hay immediately increased the demand for inspection. (Fig. 9.) This demand has increased steadily since that time with a corresponding increase in the number of inspections. In January, 1930, 24 States in which

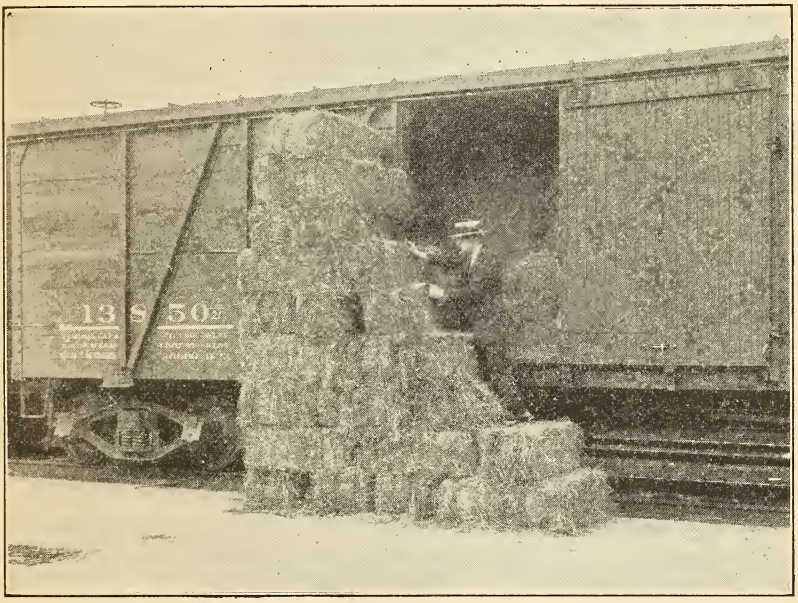

FIGURE 9.—A Federal hay inspector examining the leafiness, color, foreign material, and condition of a carload of alfalfa to determine the grade according to United States standards

hay production or consumption is important had adopted United States standards as official State standards. Inspectors trained and supervised by the United States Department of Agriculture, and licensed by them, were furnishing shipping-point inspection at 18 points as well as at 15 large central markets. United States hay standards are used as the basis for all hay purchases of the Federal Government.

Hay purchased by the United States Army is a considerable item in the hay commerce of the United States. Such hay is all inspected by Veterinary Corps officers, most of whom are trained and licensed by the United States Department of Agriculture, and Army experience with United States hay standards has proven of value to contractors as well as to the Army.

BEANS

United States standards for dry edible beans were issued September 1, 1926, based upon studies and investigations that were inaugurated in 1923. Careful consideration was given to the many commercial classes of beans, their varied uses, the different conditions under which they are produced, and problems involved in bringing them up to the standard of quality desired by various consumers as they relate to standardization. Several thousand commercial samples of the 1923, 1924, and 1925 crops of various classes of beans from typical districts of production were analyzed to determine the range and correct interpretation of such factors of quality as moisture, splits, damage, and foreign material.

For the purposes of standardization beans must be classified. At present the United States standards comprise 20 commercial classes, and each class is divided into three numerical grades: U. S. No. 1, U. S. No. 2, and U. S. No. 3, with the exception of classes Lima and baby Lima, for which there are but two numerical grades—U. S. No. 1 and U. S. No. 2. Beans that do not meet the requirements of any of the numerical grades applicable to a given class are designated "U. S. Sample grade."

The grade or quality of beans depends upon their wholesomeness for food and their relative commercial value as evidenced by their general appearance and degree of freedom from moisture and such defects as split beans, damaged beans, foreign material of any nature, and mixtures of other kinds or classes of beans.

As a factor of quality in beans, the general appearance must be considered as to good natural color, plumpness, uniformity of size, and checked skins. Color is affected by weather conditions, age, and other causes. Only when a lot of beans contains a sufficiently large percentage of such off-colored or slightly stained beans to affect its appearance seriously is this factor considered.

Absolute uniformity in size is neither necessary nor practicable. The presence of shriveled, undersized, and immature or undeveloped beans gives an uneven appearance to a sample and indicates that it has not been submitted to ordinary cleaning and screening operations.

The percentage of moisture contained in beans must necessarily be kept within certain limits to permit storing them without danger of deterioration. It is not a serious factor when the beans are well matured and harvested under favorable conditions, but when conditions are conducive to excessive moisture heavy losses from heat, mold, and other damage will result unless unusually good care is taken in storing.

In itself a split bean may be wholesome food, but when mixed with sound whole beans it destroys their uniform appearance and cooking qualities. It is also more susceptible to damage and deterioration than a whole bean.

There are various types of damage in beans, chief among which are weather, frost, disease, insect, and a combination of damage of two or more of these types. The importance of damage as a grade factor is emphasized by its relatively greater effect on quality and the difficulty attending its removal from a given lot of beans.

As a grade factor, foreign material may be considered more objectionable than any other because of its nature. But since, in most

cases, it is easily removed by present-day cleaning machinery, it is practical to keep the percentage allowance in the respective grades within very narrow limits. Foreign material in the form of adobe and stones is more prevalent in beans grown in the Rocky Mountain and Pacific Coast States because of the nature of the soil and methods of harvesting and preparing for market.

Domestic beans of mixed type rarely if ever appear on the market. Slight mixtures sometimes occur, however, and the quality or grade of the beans is affected thereby. Fortunately, mixing can be prevented by the exercise of reasonable care in the selection of seed and in handling beans through the various processes of preparation for market, and the percentage of "other beans" appearing in commercial lots of a given class is very low. Beans of different classes which blend in color and size are not so objectionable as those of contrasting types, and a larger percentage of such beans may be permitted in a lot without seriously affecting its commercial quality.

The classes defined in the standards include all beans identical in type with such classes regardless of where grown. For example, beans of foreign origin that are practically identical in type with the large white beans characteristic of those varieties grown on the Pacific coast would be classed "large white" if offered for inspection under the United States standards. Many types of beans imported from various countries, however, can not be classed under any of the classes now provided in the standards. This condition seems to warrant the incorporation of other classes in the standards to cover the more important of these types, and studies are being conducted with this in view.

One of the prime objects of United States standards for beans is to insure consistent deliveries as to quality purchased. This can be more fully accomplished when such standards are uniformly applied under the supervision of a distinterested agency. To this end a Federal bean-inspection service has been organized for the purposes of providing inspection on the basis of the United States standards by men trained and licensed by and under the supervision of the United States Department of Agriculture. On January 1, 1930, inspectors at 15 important shipping points and terminal markets held licenses to inspect beans under cooperative agreements with State departments of agriculture or commercial exchanges.

SOYBEANS

With the rapid increase in the production of soybeans, the development of a commercial outlet or an industrial market naturally followed. At the same time it was evident that standards of quality that would reflect the relative value of soybeans for industrial purposes were needed to insure more equitable returns to growers. After extensive studies of marketing practices and requirements of the soybean-crushing industry tentative standards were issued in 1925. Following a year's trial these standards were revised slightly, effective September, 1926, and recommended for use in the grading and marketing of this commodity.

For purposes of standardization soybeans are divided into five classes on the basis of color: Yellow, green, brown, black, and mixed.

There are five grades in each class—U. S. Extra No. 1, U. S. No. 1, U. S. No. 2, U. S. No. 3, and U. S. No. 4. There is also a "Sample grade" to take care of any lots that do not meet the requirements of the standardized grades. The grades are based upon variations in the following quality factors: (1) Condition and general appearance, (2) test weight per bushel, (3) moisture, (4) split soybeans, (5) damaged soybeans, and (6) foreign material.

The use of these standards is increasing with the expansion of the soybean-crushing industry. They have been made the basis of contract for practically all soybeans purchased by mills, and are applied by Federal licensed inspectors located at terminal markets and crushing centers in the Corn Belt and South Atlantic States. Inspection is available at shipping points in the producing sections of North Carolina and Missouri, from which large quantities of soybeans are shipped for seed purposes.

Extensive use of these standards has demonstrated their practicability in the marketing of soybeans both for seed and for crushing purposes. The U. S. Extra No. 1 and U. S. No. 1 grades represent high-quality seed stocks in so far as the absence of physical defects are concerned. U. S. No. 2 is the basic grade on which soybeans are purchased by mills. A slight premium is paid by mills for U. S. No. 1, whereas U. S. No. 3, U. S. No. 4, and Sample grade soybeans are subject to appropriate discounts.

BROOMCORN

Broomcorn has been marketed heretofore in a rather haphazard way without uniform practices or uniform standards of quality or grade. As it is a comparatively small crop and has a limited use, it has failed to command the attention of marketing agencies, which have played such an important part in developing uniform marketing practices and standards for the more important agricultural products.

United States standards for broomcorn were promulgated on July 1, 1926, as a result of about four years of investigational work by the Bureau of Agricultural Economics. These standards were immediately put into use by the Department of Agriculture in an inspection service conducted in cooperation with the Oklahoma State Department of Agriculture.

A similar Federal-State inspection service was established in New Mexico in 1929 and some use of the standards has occurred in other States.

Much interest in standardization of brooms developed among manufacturers in the fall of 1929. It was evident that little could be done to standardize brooms without definite and generally used standards for broomcorn. As a result broomcorn dealers and broom manufacturers appointed a committee to work with the Department of Agriculture in developing the Federal broomcorn standards and the inspection service.

LIVESTOCK AND MEATS

For years it has been apparent to the most casual observer that much of the confusion in the central livestock markets might be avoided by adopting a proper system of standardization. Those

who attempted to study the market requirements for the country as a whole were handicapped not only by the necessity of understanding the preferences, standards, and business methods of the individual markets but also by the practice of using identical terms with wide variations in meaning. Credit is given to the University of Illinois for the pioneer research work in Chicago and other large livestock markets which led to the publication of a bulletin entitled "Market Classes and Grades of Cattle with Suggestions for Interpreting Market Quotations."

When the Bureau of Markets, now the Bureau of Agricultural Economics, inaugurated in 1917 a market-reporting service on livestock and dressed meats the recommendations of the Illinois station were used as a basis for reporting prices and trade conditions.

At the same time, under provisions of the annual agricultural appropriation acts which have provided authority and funds for marketing research, the scope of the original investigation was greatly broadened to include the development of a complete system of classification for livestock and dressed meats.

Before proceeding to a discussion of grades it should be understood that livestock are separated into various groups before the actual grading is done.

Kind refers to the species, as cattle, hogs, or sheep.

Class separates cattle; for example, into steers, heifers, cows, bulls, stags.

Subclass provides for subdivisions based upon the relative desirability of the animal for certain rather general purposes; as slaughter, feeder, or stocker.

These subclasses based upon general use are not sufficiently accurate to cover all needs of the trade; therefore it is frequently necessary to provide additional subdivisions based on particular suitability for certain special uses; as, for example, by dividing slaughter hogs into butcher, bacon, and packing hogs.

Further segregations are made on the basis of age and weight. Certain classes of consumers still require heavyweight cuts of meats, but there is a rapid shifting of demand to lightweight cuts. Stockyard operatives therefore sort animals to obtain cuts that will meet these requirements.

The grades for livestock are based on three basic factors: Conformation, finish, and quality.

Conformation is the build, outline, or contour of the animal. It is due largely to the size and shape of the bones and muscles and the proportions between the different primal parts, such as round, loin, rib, or shoulder. Hence conformation is chiefly attributable to breeding, though sex condition also exerts a powerful influence, except in the case of very young animals. Fat covering is responsible for marked modifications of conformation; hence feeding and care have an important bearing on the matter. Standards or ideals of conformation depend on the immediate use to which the animal is to be put. Grade for grade, a smoother and rounder conformation is demanded in animals intended for immediate slaughter than in those that are to be used for further feeding.

Finish is fat. It includes both the fat on the outside of the animal's body and on the inside of the abdominal and thoracic

cavities, also the deposits of fat which lie along and between the large muscles. Naturally in the live animal the interior fats can be judged only by analogy. Finish involves the quantity, quality, and distribution of fat. Like conformation, it is dependent somewhat on inherited tendencies or breeding, but in the main it depends on the quantity, kind, and quality of feed, sex condition of the animal, and on methods of handling.

Quality is, strictly speaking, a characteristic of the muscle or lean meat of the animal and of the intramuscular and intercellular fat contained therein. It also involves the relative size, shape, and condition of the bones and the ratio of bone to muscle and fat. In animals intended for further feeding, quality involves still another characteristic, a characteristic which, though of vast importance, is rather intangible and difficult to describe fully, namely, the ability to economically take on added weight. This is not a concrete thing but rather an inherited trait or tendency. Quality in a live animal is difficult to describe. By experienced stockmen it can, however, be judged with fair accuracy from certain external evidences, such as fineness and softness of hair, thickness and pliability of hide, width of muzzle, refinement of head, and other similar characteristics. Frequently these external features are called quality. When this is done it amounts to mistaking the tangible, external evidences of a thing for the thing itself.

As in the case of other agricultural products, the grading of livestock has not been reduced to the status of an exact science. But there is a close correlation between certain external and internal characteristics which enable the experienced grader to do his work with surprising accuracy.

The grades for dressed meats exactly correspond in number and names with those of the live animals that produce them and are based on the same factors, but in the case of meat the color of flesh, fat, and bone may also be taken into consideration. (Figs. 10 and 11.)

Official United States standards for carcass beef were promulgated by the Secretary of Agriculture to become effective July 1, 1926. These standards had been used continuously in the department's wholesale meat-market reporting service since February, 1917. They had also been applied in the grading of millions of pounds of meat for use by the United States Lines, for many independent steamship lines, and for other commercial concerns, not to mention the purchasing departments of numerous public institutions, both Federal and State.

Prior to the official promulgation of these standards, public hearings were held in Portland, Oreg., Chicago, Ill., and New York City, to which livestock producers, slaughterers, wholesale and retail meat dealers, agricultural college workers, and others interested in the livestock and meat industries were invited. The sentiment manifested at these meetings was overwhelmingly favorable, although certain suggestions were given careful consideration in later revisions of the grades in these standards.

Many other hearings have been held in the livestock and meat-consuming centers of the country at which tentative standards for cattle, calves, sheep, and lambs and their carcasses have been presented for suggestions and criticism.

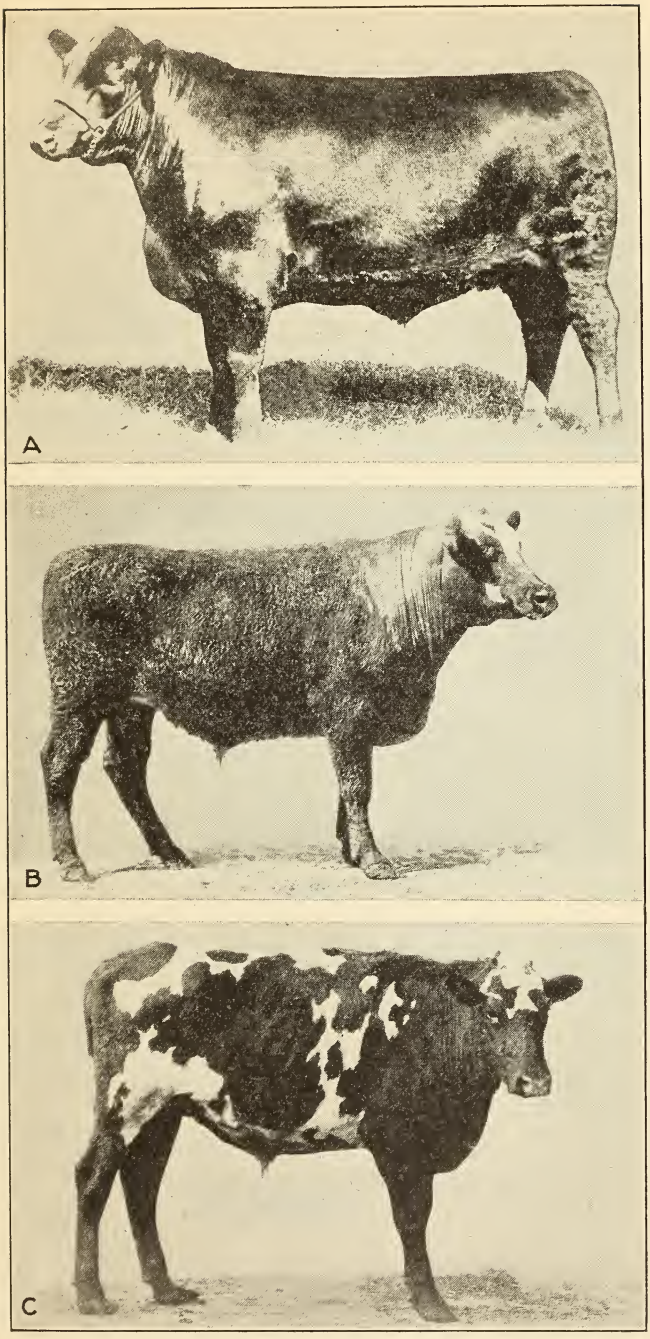

FIGURE 10.—Grades of slaughter steers. A, Prime grade slaughter steer; B, Good grade slaughter steer; C, Common grade slaughter steer

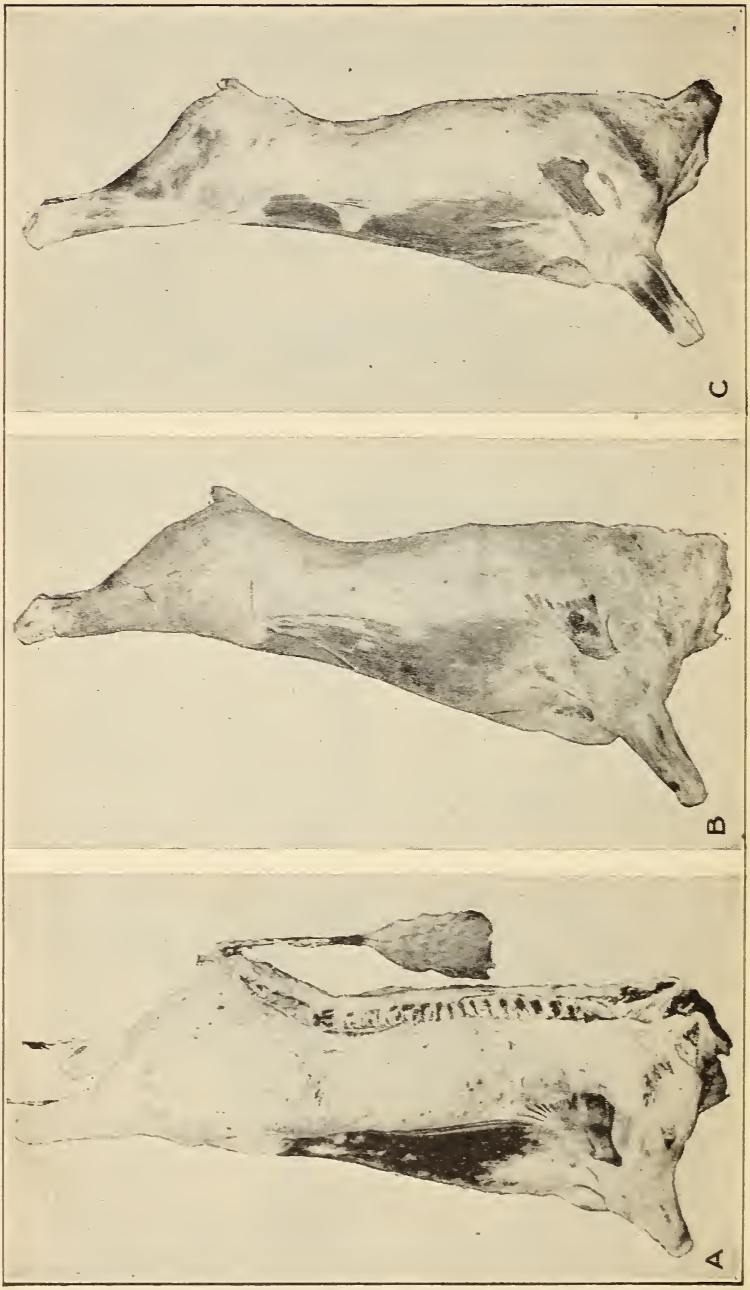

FIGURE 11.—Grades of steer carcasses. A, Prime grade steer carcass; B, Good grade steer carcass; C, Common grade steer carcass

TOBACCO

The department's research having in view the standardization of American-grown tobacco has been extended over a period of years. The first standards were completed in 1922 and issued in tentative form as a basis for discussion and for experimental use in the industry. These investigations were carried on under authority of that section of the United States warehouse act that authorizes the Secretary of Agriculture to establish and promulgate standards for agricultural products by which their quality or value may be judged or determined. Since the passage of the tobacco stocks and standards act [2] which provided that the Secretary of Agriculture shall establish standards for the classification of tobacco, the tobacco standardization work of the department has been conducted under authority of the latter act.

In January, 1926, a "Type classification of American-grown tobacco" was prepared and issued under the authority of the United States warehouse act. For warehouses licensed under this act it is required that the types of tobacco be stated on the receipts, and heretofore no uniform system of type classification has existed. In March, 1929, this classification was revised and issued by the Secretary under authority of the tobacco stocks and standards act. In October, 1929, the classification was amended to cover classes, types, and group of grades and published as the Classification of Leaf Tobacco.

According to the official classification of the United States Department of Agriculture all American-grown tobaccos are divided into seven classes. The first three are based on the method used in curing; the next three are based on the principal use for which the tobacco is grown, and the seventh covers small types not otherwise classified. These classes are: Flue-cured types, fire-cured types, air-cured types, cigar-filler types, cigar-binder types, cigar-wrapper types, and miscellaneous types.

The six classes cover 26 important types with 2 to 6 types in each class. The classification establishes the groups of grades for each of the 26 important types. Under the tobacco stocks and standards act the leading dealers and manufacturers are required to report to the department, quarterly, their stocks of leaf tobacco segregated by type and groups of grades. Standard grades have been published for 13 types, and grades for 7 other types have been submitted to the trade for practical demonstration. (Fig. 12.)

Tobacco is graded on the basis of the following four factors: Group, quality, color, and length. This four-in-one standard is necessary in grading tobacco in order that the trade may select tobacco suited to its particular needs with respect to each factor.

There are from four to six groups of grades in each type. The group names vary with most types, but the standard symbols are the same for the corresponding groups of all types. The standard symbols and group names for Burley tobacco, for instance, are: A—wrapper, B—leaf, C—lugs, X—trash, S—scrap, and N—nondescript.

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[2] UNITED STATES LAWS, STATUTES, etc. AN ACT TO PROVIDE FOR THE COLLECTION AND PUBLICATION OF STATISTICS OF TOBACCO BY THE DEPARTMENT OF AGRICULTURE. *In* U. S. Statutes at Large, v. 45, pt. 1, pp. 1079–1080. (U. S. Congress 70th, 2d sess., Public 661, 1929.)

As many as seven qualities may appear in a group, which are designated by numbers following the group letters. The group and quality factors, thus designated by a letter and a number, form the basis of all standard grades. Suitable symbols are added to designate color and length when they are of sufficient importance.

The various degrees of quality, from 1 to 7, are based upon the following elements of quality according to their importance in the particular group: Cleanness, soundness, smoothness, texture, elasticity, oil, wax, maturity, grain, solidity, body, strength, finish, venation, width of leaf, cure, uniformity, and injury.

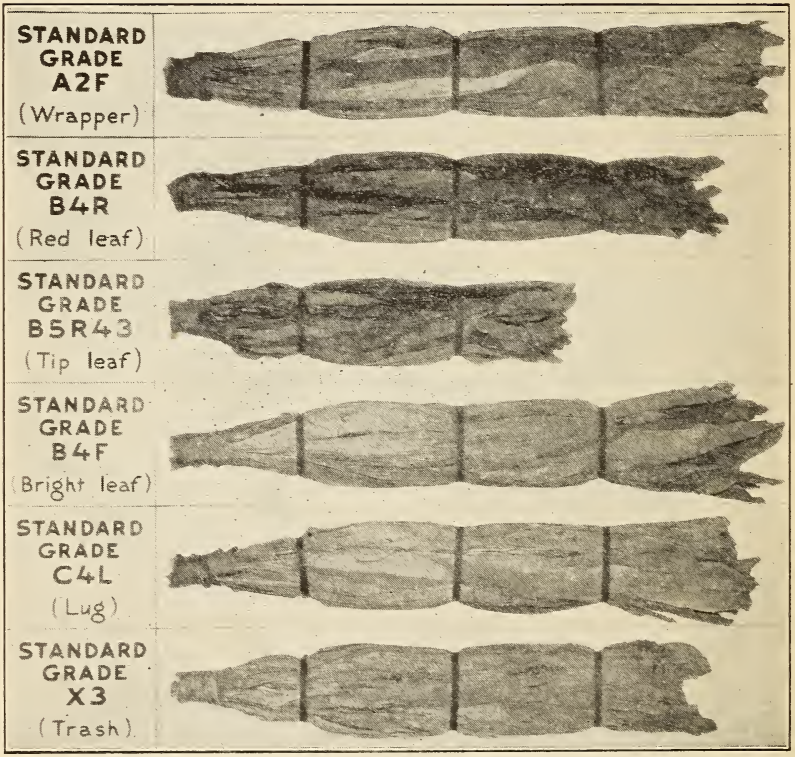
STANDARD GRADE A2F (Wrapper)
STANDARD GRADE B4R (Red leaf)
STANDARD GRADE B5R43 (Tip leaf)
STANDARD GRADE B4F (Bright leaf)
STANDARD GRADE C4L (Lug)
STANDARD GRADE X3 (Trash)

FIGURE 12.—A few samples of tobacco of United States type No. 31

The color of tobacco varies with the different types. In types in which the color is of sufficient importance to be shown as a part of the grade, the several colors are designated by letters. Some of the important colors are: L—light, F—medium, D—dark, G—green, and M—mixed. In the flue-cured class the lights are lemon colored, the mediums are orange colored, and the darks are mahogany colored.

Standards of length have been established and published. These standards provide for different variations in length of from 1 to 8 inches or 2½ to 20 centimeters. This permits the tobacco to be assorted and graded into as many lengths as may be desired for

the particular type and group. The several lengths, commonly known as sizes, are all designated by different series of numbers.

A complete tobacco-grade symbol, with the four factors arranged in order, forms a code by which the grade may be analyzed. The code system conforms to trade practice, makes for brevity, and facilitates commercial transactions. For example: Grade B5R43 (of type 31) refers to the "leaf" group of tobacco, fifth quality, red color, and size 43. Grade A2L (of type 11) refers to wrapper tobacco, second quality, and lemon color.

The complexities of tobacco grading and the long-established customs in the trade of buying on personal inspection has made it extremely difficult to secure the general adoption of any national grades. As in the case of some other products, however, this prejudice is gradually breaking down.

WOOL

Wood standards, the use of which would supersede the loose system of classification in use in the trade with its varied specifications and arbitrary interpretations, became particularly desirable during the World War. At that time great difficulty was experienced in writing Government contracts for materials made wholly or partially of wool. The need for such standards was further emphasized by those engaged in the general improvement of wool-marketing practices.

Appropriations and authority for the wool-standardization investigations were carried in the agricultural appropriation acts.

Factors of importance in determining the value of wool for certain purposes are four: Diameter of fiber, length of fiber, spinning quality of fiber, and amount and character of shrinkage. The present standards are based wholly on diameter of fiber. This is a basic factor since there is a more or less consistent relation between fineness of wool and variations in certain other factors.

In carrying on the preliminary research the Department of Agriculture secured the cooperation of the wool trade. Dealers and manufacturers supplied samples representing their ideas of market grades. The samples supplied were, in most instances, of the types actually used by the houses submitting them. In this way many hundreds of samples, embracing the many market grades, were collected for the department's use.

These samples were later assembled, examined, and studied by experts in the employ of the department. Representative staples were drawn from the samples, were compared with others of the same stated grade, were classified according to the diameter of the fibers, and were mounted. A study of these classified samples revealed a pronounced overlapping of the grades and showed none of the grades or standards then existent to be acceptable to the trade as a whole.

Another classification of the samples was made in which all were arranged according to diameter of fiber, regardless of grade specified. By elimination of duplicates the number of samples representing the range in diameter of fiber, in almost equal gradations from the finest to the coarsest, was reduced to 26.

A subclassification divided the range covered by the 26 samples into 7 sections of approximately equal scope. A set of samples,

duplicating the specimens of maximum diameter of fiber in each of the 7 groups, was prepared and set up as a possible means of defining the lines of demarcation for the 7 primary market grades.

On completion of the preliminary work the set of type samples was submitted to a number of wool and textile authorities called in conference to consider the proposed grades. As the reaction of the conference was favorable to the grades recommended, preparation of copies of the original set of grades was begun. These sets, mounted in cabinets and accompanied by appropriate descriptive matter and a table of measurements for a suggested classification of the grades according to length of staple, were made available for release as the "tentative wool grades" of the Department of Agriculture.

Investigations to determine the practicability of the tentative wool grades were conducted by (1) grading wool according to the tentative wool grades, (2) submitting sets of the tentative wool grades to authorities for criticism, (3) providing sets for use in demonstrational and educational work, and (4) holding public hearings for the discussion of the proposed grades.

During the shearing seasons of 1920, 1921, and 1922, several expert wool classifiers were engaged by the department in cooperation with the marketing bureaus and other agencies of a number of States to test the tentative wool grades in actual grading work. Several million pounds of wool were thus graded and sold on this basis.

In order that those who were directly connected with the handling of wool in the markets might be given an opportunity to study the proposed grades and submit their opinions of them, sets of the grades were sent to a number of wool dealers, wool manufacturers, and others, and their criticisms were asked for.

Sets of tentative wool grades were sent on request to agricultural colleges, woolgrowers' associations, textile schools, wool-testing houses, wool and textile publications, banks in woolgrowing and wool-marketing centers, agricultural extension workers, and others interested in wool and wool grading.

After a series of hearings the tentative wool grades were promulgated by the Secretary of Agriculture as the official permissive standards for wool, effective July 1, 1923. For grading wool in the fleece the official standards proved practical, but further refinement became necessary for use in grading wool for manufacturing processes.

At a final hearing held in Washington, D. C., the tentative wool grades were indorsed, and their establishment as standards according to American nomenclature was recommended by the joint committee on research and standardization, representing the National Association of Wool Manufacturers, the American Association of Woolen and Worsted Manufacturers, and the National Association of Worsted and Woolen Spinners. This committee further recommended that the department consult with authorities of the British wool and textile industries to the end that a correlation of the United States and British classifications might be effected and a system of nomenclature worked out that would take cognizance of the wool imported into this country. In accordance with the suggestions made by members of the industry at the final hearing in Washington, a

committee comprising one representative each from the United States Department of Agriculture, the United States Department of Commerce, and the manufacturing industry was appointed and proceeded to England in the interest of possible correlation of the American and English grades.

The Bradford Chamber of Commerce called a meeting of representatives of the English textile industries, including spinners, manufacturers, export merchants, and the British Wool Federation, to consider the correlation of English and American grades and the establishment of international standards for wool grades. These textile interests authorized the British Wool Federation to represent and act for the allied wool textile associations of England.

A representative committee of wool experts was appointed by the president of the British Wool Federation, which, with the American committee, inspected the wool grades then in use by the various concerns in the Bradford district. A set of 12 grades was prepared, representing the average Bradford qualities based on diameter of fiber. These were brought to the United States for use in further research.

From these samples a set of tentative numerical grades representative of the average Bradford qualities was prepared and correlated with the grades of the official wool standards of the United States. A cabinet containing the resulting set was sent to England for the consideration of the committee of experts appointed by the British Wool Federation. After a careful examination by the committee slight changes were suggested. These changes were made when the returned cabinet reached Washington. The action of the joint English and American standardization committee was approved by a representative committee of the wool textile industry.

In September, 1925, the United States wool standardization committee, composed of one representative each of the United States Department of Agriculture, the United States Department of Commerce, and the cooperating manufacturing associations, visited England for the purpose of bringing to a final conclusion, if possible, the correlation of the American and English grades.

The work of correlating the proposed official wool standards and average Bradford qualities was carried on by a committee composed of members of the British Wool Federation appointed by the Bradford Chamber of Commerce, in cooperation with the American committee. The English committee suggested that standard grades for top be established corresponding with the diameter of fiber in the wool standards. This suggestion met with the approval of the American committee. At the conclusion of the conferences between the English and American committees, the Bradford Chamber of Commerce, acting for all of the allied wool textile associations in Great Britain, advised that a regular meeting of the chamber had been held and that the action of the British committee had been unanimously approved by the chamber.

After the arrival of the American committee in the United States, group conferences were held with members of the wool industry with reference to the establishment of numerical grades for wool and top. As a result of these several conferences a set of proposed

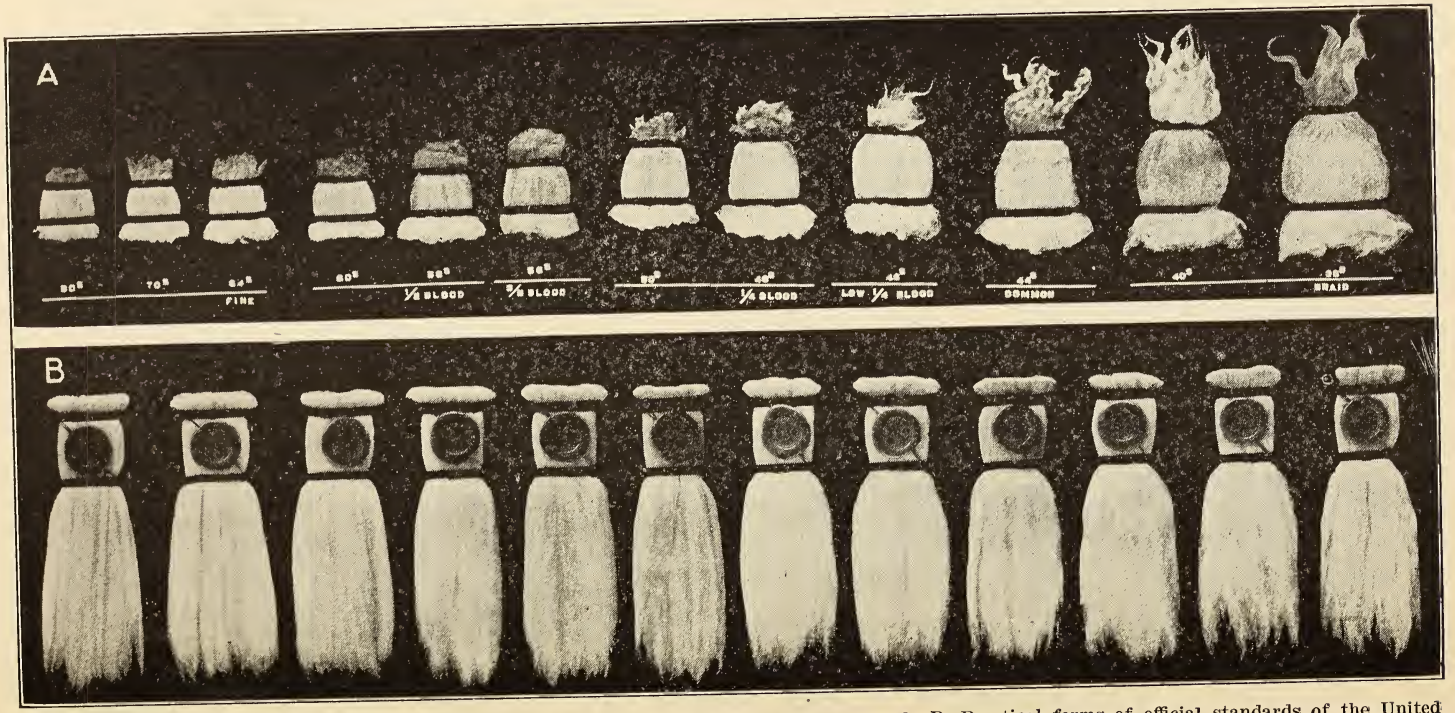

FIGURE 13.—A, Practical forms of official standards of the United States for grades of wool; B, Practical forms of official standards of the United States for grades of wool top

numerical grades for wool and top were prepared and presented for consideration of members of the industry at the hearing in Washington, D. C., on April 29, 1926.

Work leading up to international standards and the development of the proposed standards and preparation of the forms were fully explained by members of the American committee. A recess was then declared to afford the representatives who attended the hearing an opportunity to examine the grades in the proposed standards. At the final session of the hearing comments and criticisms were urgently invited. No opposition was manifested, and a motion to indorse the

FIGURE 14.—Preparing practical forms of the official wool standards of the United States

grades and recommend their adoption as the official standards of the United States for grades of wool and wool top was unanimously passed.

In the establishment of these standards (fig. 13) the requirements of the producers and merchants of the United States are adequately provided for. Sets of seven official grades are distributed, each of which can be used as a basis for grading entire fleeces of wool. Either numerical designations or the American nomenclature may be used for these seven standard grades.

Sets of 12 standard grades are also issued and each grade may be used as a basis for the necessary division of the qualities found within fleeces when wool is sorted for manufacture. (Fig. 14.) The grade terms for the sorting grades are grouped, and they correspond with the grade terms for grading wool. The tabulations following

show the relationship between the names used for the 12 numerical grades in the new official standards and the names used for the seven official grades which are now superseded.

New terminology (numerical)	Old terminology (American)
80's, 70's, 64's	Fine.
60's, 58's	½ blood.
56's	⅜ blood.
50's, 48's	¼ blood.
46's	Low ¼ blood.
44's	Common.
40's, 36's	Braid.

The present standards for wool and wool top have been indorsed by representative bodies both in the British and American trade. They were officially promulgated under authority of the United States warehouse act, to become effective July 1, 1926.

Work on tentative standards for mohair is now under way.

LIST OF STANDARDS FOR FARM PRODUCTS FORMULATED BY THE BUREAU OF AGRICULTURAL ECONOMICS

Complete sets of the specifications or descriptions of the grades in all the standards formulated by the Bureau of Agricultural Economics are seldom needed by workers, and any detailed list of such standards is likely soon to become somewhat out of date, but the following list, as of 1930, will always be suggestive and can be used as a basis for requests for selected standards.

COTTON

Grade and color:
- Upland—
  - White grades. Promulgated 1914; last revision 1924.
  - Yellow tinged, yellow stained, and blue stained colors. Promulgated 1916; revised 1923.
  - Gray, spotted, and light stained. Promulgated 1922.
  - Extra white. Promulgated 1926, effective 1927; revised 1929, effective 1930.
- American-Egyptian (grade and color)—Promulgated 1918; last revision 1929, effective 1930.
- Sea Island (grade and color)—Promulgation 1918; discontinued 1925.

Length of staple:
- Promulgated 1918; original representations, last revision 1928, effective 1929. (Note: Service and Regulatory Announcements 92 and Service and Regulatory Announcements 117 [Agr. Econ.] contain descriptions of all cotton standards now in force.)

American cotton linters:
- Grade, promulgated 1925, effective 1926. (Service and Regulatory Announcements 94 [Agr. Econ.].)
- Color, promulgated 1927, effective 1928. (Service and Regulatory Announcements 109 [Agr. Econ.].)

DAIRY AND POULTRY PRODUCTS

Butter. Recommended 1918. (Service and Regulatory Announcements 51, Markets.)
Cheese. American (whole milk). Recommended 1922. (Office of Secretary, Circular 157.)
Eggs. Recommended 1923; last revision 1929. (Mimeographed circular.)
Poultry, dressed. Recommended 1928.
Poultry, live. Recommended 1928. (Mimeographed circular.)
Turkeys, dressed. Recommended 1928; revised 1929. (Mimeographed circular.)

FRUITS AND VEGETABLES AND RELATED PRODUCTS

Apples, barreled. Recommended 1918; last revision 1928. (Service and Regulatory Announcements 93 [Agr. Econ.], Amendment 9.)
Apples, cannery for sauce purposes. Recommended 1929.
Apples, cannery for slicing purposes. Recommended 1929.
Apricots. Recommended 1928.
Artichokes. Recommended 1926.
Asparagus. Recommended 1922; last revision 1927.
Beans, string (wax or green). Recommended 1924; revised 1927.
Beets, bunched. Recommended 1924; last revision 1927.
Cabbage. Recommended 1921; last revision 1928.
Cantaloupes. Recommended 1923; last revision 1927.
Carrots, bunched. Recommended 1924; last revision 1927.
Carrots, topped. Recommended 1926; revised 1928.
Cauliflower. Recommended 1922; revised 1925.

Celery. Recommended 1922; last revision 1928.
Cherries, sweet. Recommended 1926; revised 1927.
Citrus fruits, Florida. Recommended 1923; last revision 1929.
Citrus fruits, Texas. Recommended 1929.
Corn, green. Recommended 1926; revised 1927.
Cucumbers. Recommended 1922; revised 1927.
Dewberries and blackberries. Recommended 1926; revised 1928.
Eggplant. Recommended 1925.
Endive or escarole or chicory. Recommended 1928.
Garlic. Recommended 1927.
Grapes, American, eastern type bunch. Recommended 1925; last revision 1929.
Grapes, juice. Recommended 1923; last revision 1929.
Grapes, packed in sawdust or other packing material. Recommended 1925; last revision 1929.
Grapes, table. Recommended 1924; last revision 1929.
Grapefruit, California and Arizona. Recommended 1929.
Honey. Recommended 1927. (Circular 24.)
Honey Dew and Honey Ball melons. Recommended 1927.
Lettuce. Recommended 1922; revised 1926.
Mushrooms. Recommended 1928.
Mustard greens. Recommended 1928.
Okra. Recommended 1928.
Onions, Bermuda. Recommended 1918; last revision 1927.
Onions, Creole. Recommended 1926.
Onions, northern grown. Recommended 1920; last revision 1928.
Oranges, California. Recommended 1929.
Peaches. Recommended 1922; revised 1924.
Peanuts, farmers' stock Virginia type. Recommended 1929.
Peanuts, farmers' stock white Spanish. Recommended 1924; last revision 1928.
Peanuts, white shelled Spanish. Recommended 1921; revised 1925.
Peanuts, runner. Recommended 1925; revised 1925.
Pears. Recommended 1924; revised 1925.
Peas, fresh. Recommended 1926; revised 1928.
Peppers, sweet. Recommended 1923; revised 1929.
Pineapples. Recommended 1924.
Plums and prunes. Recommended 1923; revised 1926.
Potatoes. Recommended 1917; last revision 1927. (Service and Regulatory Announcements 93 [Agr. Econ.], amendment 5.)
Radishes, bunched. Recommended 1920.
Romaine. Recommended 1928.
Shallots, bunched. Recommended 1927.
Spinach. Recommended 1925; last revision 1927.
Spinach, cannery. Recommended 1930.
Strawberries. Recommended 1918; last revision 1928.
Sweet potatoes. Recommended 1920; revised 1926.
Tomatoes, cannery. Recommended 1923; revised 1926.
Tomatoes, fresh. Recommended 1922; last revision 1929.
Turnip greens. Recommended 1928.
Turnips, bunched. Recommended 1924; revised 1927.
Watermelons. Recommended 1923; revised 1925. (Mimeographed circulars unless otherwise stated.)

CONTAINERS FOR FRUITS AND VEGETABLES

Climax baskets. Promulgated 1916.
Berry boxes. Promulgated 1916.
Till baskets. Promulgated 1916. (Service and Regulatory Announcements 104 [Agr. Econ.].)
Hampers. Promulgated 1928.
Round stave baskets (including straight-side baskets). Promulgated 1928.
Split of market baskets. Promulgated 1928. (Service and Regulatory Announcements 116 [Agr. Econ.].)

GRAIN

Shelled corn. Promulgated 1916; last revision 1924.
Wheat. Promulgated 1917; last revision 1924.
Oats. Promulgated 1919; last revision 1928.
Rye. Promulgated 1923; amended 1924.

Grain sorghums. Promulgated 1924.
Feed oats. Promulgated 1925.
Mixed feed oats. Promulgated 1925.
Barley. Promulgated 1926; amended 1927.
(Handbook of Official Grain Standards contains descriptions of these standards.)
Rice, brown. Promulgated 1927.
Rice, milled. Recommended 1918; promulgated 1927.
Rice, rough. Recommended 1923; promulgated 1927; revised 1929.
(Handbook for Official Standards for Milled Rice, Brown Rice, and Rough Rice and Service and Regulatory Announcements 108 [Agr. Econ.], amendment 1.)

HAY AND RELATED PRODUCTS

Timothy and clover hay. Recommended 1922; promulgated 1925; last revision 1929.
Alfalfa and alfalfa mixed hay. Promulgated 1925; last revision 1929.
Prairie hay. Promulgated 1925; last revision 1929.
Johnson and Johnson mixed hay. Promulgated 1925; last revision 1929.
Grass hay. Promulgated 1927; revised 1929.
Mixed hay. Promulgated 1925; last revision 1929. (Handbook of Official Hay Standards 540 revised, and Amendment 2.)
Soybean and soybean mixed hay. Recommended 1928. (Mimeographed circulars.)
Beans, dry edible (19 classes). Recommended 1926. (Handbook of United States Standards for Beans. H. F. S. 751.)
Beans, Butternut. Recommended 1928. (Multigraphed circular.)
Broomcorn. Recommended 1926; revised 1927. (Mimeographed circular.)
Soybeans. Recommended 1926; revised 1926. (Handbook of United States Standards for Soybeans. H. F. S. 899.)

LIVESTOCK

Cattle, slaughter. Promulgated 1928. (Service and Regulatory Announcements 112 [Agr. Econ.] and Department Bulletin 1464.)
Cattle, feeder, and stockers. (Department Bulletin 1464.)
Calves, feeders and stockers. (Circular 28.)
Calves, vealers and slaughter. Promulgated 1928. (Service and Regulatory Announcements 113 [Agr. Econ.] and Circular 28.)
Hogs, slaughter. (Mimeographed circular.)
Sheep, slaughter.
Lambs, slaughter. (Mimeographed circular.)
Standard schedule of market classes and grades of cattle, calves, vealers, hogs, sheep and lambs. (Department Bulletin 1360.)

MEATS

Fresh and frozen carcass beef. Promulgated 1926. (Service and Regulatory Announcements 98 and 99 [Agr. Econ.] and Department Bulletin 1246.)
Calf and veal carcasses. Promulgated 1928. (Service and Regulatory Announcements 114 [Agr. Econ.].)
Fresh, frozen, and cured pork. (Mimeographed circular.)
Fresh and frozen lamb. (Department Bulletin 1470.)
Fresh and frozen mutton. (Department Bulletin 1470.)

TOBACCO

Flue-cured tobacco of types 11, 12, 13, and 14. Recommended 1922; last revision, 1929.
Fire-cured tobacco of type 21. Recommended 1923; revised 1929.
Fire-cured tobacco of types 22 and 23. Recommended 1922; last revision 1929.
Fire-cured tobacco of type 24. Recommended 1922; revised 1927.
Burley tobacco of type 31. Recommended 1926; revised 1929.
Maryland tobacco of type 32. Recommended 1928.
One-sucker tobacco of type 35. Recommended 1923; revised 1927.
Green River tobacco of type 36. Recommended 1922; revised 1925.
Sun-cured tobacco of type 37. Recommended 1923.

Seedleaf tobacco of type 41. Recommended 1926.
Gedhardt tobacco of type 42. Recommended 1923.
Zimmer tobacco of type 43. Recommended 1923.
Little Dutch tobacco of type 44. Recommended 1923.
Broadleaf tobacco of type 51. Recommended 1923.
Havana Seed tobacco of type 52. Recommended 1923.
Wisconsin cigar tobacco of types 54 and 55. Recommended 1923; revised 1926. (Descriptions of these standards for types of tobacco appear in mimeographed circulars.)
United States standard tobacco sizes. Recommended 1926. (Miscellaneous Circular 83.)
Classification of leaf tobacco. Promulgated 1929. (Service and Regulatory Announcements 118 [Agr. Econ.].)

WOOL

Wool. Diameter of fiber. Promulgated 1923; revised 1926.
Wool top. Diameter of fiber. Promulgated 1926. (Service and Regulatory Announcements 100 [Agr. Econ.].)

CANNED FOODS

Canned beans, Lima. Recommended 1929.
Canned beans, snap or string. Recommended 1929.
Canned beets. Recommended 1929.
Canned corn, cream style. Recommended 1928.
Canned corn, whole grain. Recommended 1928.
Canned peas. Recommended 1928.
Canned pumpkin. Recommended 1929.
Canned spinach. Recommended 1928.
Canned tomatoes. Recommended 1928; revised 1929. (Mimeographed circulars.)

This circular is a contribution from

Bureau of Agricultural Economics---------- NILS A. OLSEN, *Chief*

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